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The prevalence of two major health risk behaviours in an Irish older adult population & their relationship to ageing self-perceptions: Findings from the Irish Longitudinal Study on Ageing

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The prevalence of two major health risk behaviours in an Irish older adult population & their relationship to ageing self-perceptions: Findings from the Irish Longitudinal Study on Ageing

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Declaration

I declare that this thesis, which I submit to RCSI for examination in consideration of the award of a higher degree Master of Science in Health Service Research, is my own personal effort. Where any of the content presented is the result of input or data from a related collaborative research programme this is duly acknowledged in the text such that it is possible to ascertain how much of the work is my own. I have not already obtained a degree in RCSI or elsewhere on the basis of this work. Furthermore, I took reasonable care to ensure that the work is original, and, to the best of my knowledge, does not breach copyright law, and has not been taken from other sources except where such work has been cited and acknowledged within the text.

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Abstract

Objective: The leading causes of death among older Irish adults are diseases of the circulatory system. These are in a major part, diseases of lifestyle and so health behaviours across the lifecycle, including older age, are important targets for prevention. It is imperative to understand older adults' engagement in preventive health behaviours such as not smoking and drinking sensibly. While research on the association between ageing self-perceptions and health behaviours is relatively novel, studies have shown that ageing self-perceptions arising from age stereotypes, influence the health behaviours of older adults in that older adults with positive ageing self-perceptions are more likely to practice preventive health behaviours over time. The aim of this thesis was to document the patterns of these behaviours and determine the nature of the relationship between ageing self-perceptions and the two health behaviours.

Design and setting: Participants were 6,576 community-dwelling Irish adults (age 50+ years), who took part in the first wave of the Irish Longitudinal Study on Ageing (TILDA). They completed the Ageing Perceptions Questionnaire (APQ) and answered the questions regarding their smoking and alcohol behaviours. The APQ measures individual views on own ageing across seven domains (timeline chronic, timeline cyclical, consequences positive, consequences negative, control positive, control negative, and emotional representations).

Measures: To examine the study hypotheses that strong beliefs on each of the APQ domains would be related to drinking and smoking behaviours, multinomial logit models (MNLM) were fitted using each of the seven domains on the APQ as the main independent variables and drinking category as one dependent variable with non-drinkers being the omitted group and smoking status as the other dependent variable with never smokers the reference group. Covariates included age, gender, education, marital status, self-rated health, depression, smoking status (or drinking status) and physical activity. The regression parameter estimates for all variables were estimated relative risk ratios (RRR). The study hypotheses that the relationship of the APQ domains to drinking and smoking would be stronger when there was an inter-relationship between the two health behaviours, was tested using multivariate

analyses of covariance (MANCOVA). All tests were one-tailed and a critical alpha level of 0.05 was used.

Results: Overall, TILDA's participants expressed positive views regarding the ageing process in that they acknowledged more positive than negative aspects to ageing. However, the oldest age group perceived their ability to cope with ageing more negatively. Nonetheless, the variability of ageing beliefs at an individual level indicated that many older Irish adults did not incorporate negative ageing stereotypes into their own self-perceptions.

In the TILDA population overall, most men and women stayed within recommended daily limits of 4 units on a drinking occasion for men and 3 units for women, with men consuming on average 4 units of alcohol per drinking occasion and women consuming 2.5 units. Women were more likely to be non-drinkers (30% vs. 20%) while men displayed significantly higher alcohol use patterns (39% vs. 22%). The highest proportion of non-drinkers was among the oldest age group (75+). However, one third of older drinkers were at risk either because of drinking to excess in a single drinking episode or because they exceeded the weekly drinking limits.

In the overall TILDA population, one in five older Irish adults was a current smoker with more women (54%) than men in this category (46%). The highest percentage of current smokers reported that they smoked between 20-39 cigarettes per day (41%). They were also more likely to have been educated to secondary school level (57%) and to be in the 50-64 year age category (69%). Consistent with previous studies, this study noted a decreasing trend in smoking prevalence associated with age, for both men and women.

With regard to the study hypotheses, the study revealed that while some of the individual domains of the APQ were implicated as risk factors for engaging in harmful health behaviours others were found to be protective against harmful engagement. Pertaining to alcohol consumption, the RRRs indicated that a chronic awareness of age and ageing and beliefs about control over both positive and negative ageing experiences were associated with drinking status. Individuals who were constantly preoccupied with their experiences of age or ageing were 14% more likely to be

harmful drinkers. Moreover, individuals who perceived that they were in control over positive ageing experiences were 12% more likely to be moderate drinkers and 15% more likely to be harmful drinkers than those who perceived less control. Finally, individuals who perceived more control over negative ageing experiences had a reduced risk of being either moderate drinkers (10%) or harmful drinkers (13%) when compared with non-drinkers.

In relation to smoking, the RRRs indicated that a lack of stability in the individual's experience of ageing, having a negative outlook, and negative beliefs about control over ageing experiences were associated with smoking status. In this study, former smokers were 10% more likely to be more preoccupied with their own experiences of age or ageing when compared with never smokers. Additionally, individuals who perceived negative consequences associated with the ageing process had a reduced risk of being either former smokers (11%) or current smokers (20%) when compared to never smokers. Finally, individuals who perceived less control over negative ageing experiences were 13% more likely to be current smokers over never smokers.

The investigation into the strength of the relationship of the APQ domains to the interaction between the two health behaviours indicated that three ageing self-perceptions played a stronger role over and above that of the established covariates. Perceived levels of pessimism regarding both the positive and negative consequences of ageing were associated with a decreased risk of engaging in more than one risky health behaviour (expected to decrease by 0.135 units and 0.121 units respectively). In addition a strong negative emotional response to ageing was associated with an increased level of engagement in risky health behaviour (expected to increase by 0.128 units)

Conclusion: Although the explanatory power of some of the established covariates of alcohol and tobacco consumption was stronger than that of the individual APQ domains, this study demonstrated the benefits to applying the psychology of ageing to health behaviours. By looking at health behaviours in this way we are able to gain a better understanding of the ways in which our cognitive representations of age and ageing are associated with how we might regulate our health behaviours to manage

our ageing and how we in turn might appraise our ability to cope with our actions. These findings have some implications at a practical level as the individual domains of the ageing experience can be targeted in interventions aimed at facilitating more desirable or adaptive outcomes or to moderate maladaptive outcomes associated with old age. Such interventions could be implemented at an individual level, at a societal level by means of public education, or at a clinical level by means of psychological intervention. The findings also have implications at a theoretical level as further development of the APQ using the self-regulation model (SRM) framework might further elucidate the adaptive or maladaptive value that specific ageing self-perceptions may play in shaping clusters of health-risk behaviour.

In light of population ageing, there is an increasing need to give ageing self-perceptions more detailed consideration in ageing research, to help us understand why some older adults engage in preventive health behaviours while others do not. It is hoped that the information generated from this thesis will promote a greater understanding of the role of ageing self-perceptions that will shape healthcare delivery and social policy and to foster disease prevention with health promotion efforts and systemic reforms.

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This thesis is dedicated to the memory of my late father Anthony Joseph O'Keeffe "Joe" (1926-2010).

Though much is taken, much abides; and though
We are not now that strength which in old days
Moved earth and heaven, that which we are, we are;
One equal temper of heroic hearts,
Made weak by time and fate, but strong in will
To strive, to seek, to find, and not to yield."

Alfred Tennyson

Abbreviations

ANCOVA	Analysis of covariance
ANOVA	Analysis of variance
APQ	Ageing perceptions questionnaire
BMD	Bone mineral density
CAGE	Cut down-annoyed-guilty-eye opener
CAPI	computer-aided personal interview
CHD	Coronary heart disease
COPD	Chronic Obstructive Pulmonary Disease
CSM	Common Sense Mode
CSO	Central Statistics Office
CVD	Cardiovascular disease
DOH	Department of health
DOHC	Department of health and children
ELSA	English Longitudinal Study on Ageing
ERA-38	Expectations Regarding Ageing Survey
ESRI	Economic and Social Research Institute
EU	European Union
GDP	Gross Domestic Product
HADS-A	Hospital Anxiety Depression Scale – Anxiety subscale
HRS	Health and Retirement Survey
IARC	International Agency for Research on Cancer
IPAQ	the International Physical Activity Questionnaire
MANCOVA	Multivariate analysis of covariance
MAR	Missing at random

MNAR	Missing not at random
MVREG	Multivariate regression
MNLM	Multinomial logit models
OECD	Organization for Economic Co-operation and Development
PAE	Positive Alcohol Expectancies
QF	Quantity and frequency (pertaining to alcohol consumption)
RRR	Relative risk ratios
SC	Social Class
SCQ	Self completion questionnaires
SES	Socio-economic status
SHARE	the Survey of Health, Ageing and Retirement in Europe
SLÁN	Survey of Lifestyle, Attitudes and Nutrition in Ireland
SRM	Self-regulation Model
TILDA	The Irish Longitudinal Study on Ageing
UK	United Kingdom
UN	United Nations
VIF	variance inflation factor
WHO	World Health Organization

Chapter 1. Introduction

1.1. Research context

Empirically, this thesis is situated within the context of a larger programme of research called The Irish Longitudinal Study on Ageing (TILDA). TILDA is a large representative study of over 8,000 people, aged 50 and over and who are resident in Ireland. TILDA will chart health as well as the social and economic circumstances of respondents over five waves of data collection in a 10-year period, with health assessments every other wave. The present thesis aims to examine the experiences of ageing self-perceptions in Ireland in relation to alcohol consumption and smoking by examining the data that was gathered in the first wave of TILDA in 2010.

1.2. Population ageing

One of the key factors providing motivation for this research is population ageing, specifically concerning the march toward older age among the populations of industrialised/developed countries throughout the world. According to the United Nations (UN), among these countries, life expectancy rates have doubled over the past two centuries, reaching 81 years for women and 74 years for men (UN, 2011). The median age of the population in these developed regions increased from 29 years in 1950 to approaching 40 years in 2009. Among those aged 60 years and over, the greatest increase has been in those aged 80 years and over, increasing at a rate of 4% per year and accounting for one in every seven older adults aged 60 and over. This is expected to increase to one in every five older adults by 2050 (UN, 2011). In Ireland, the percentage of older males aged 65 years and over is projected to increase from 9.7% in 2002 to approximately 14.1% by 2021. The percentage of older females is projected to increase from 12.5% in 2002 to approximately 16.4% by 2021 (Connell & Pringle, 2004).

While population ageing represents a success story for these developed regions, it also poses considerable challenges for them as they strive to meet the needs of their

ageing populations, specifically in relation to social security benefits and healthcare costs. In Ireland alone the cost of providing a state pension to all individuals over 65 years of age in 2002 was equal to 3% of Ireland's gross domestic product (GDP) and is expected to increase to 9% of GDP by the year 2050 (Bennett, Fadden, Harney, O'Malley, Regan & Sloan, 2003). In addition, Bennett et al (2003) outlined predicted healthcare costs between 2002 and 2050 for Ireland's ageing population with the cost of acute hospital admissions in 2002 standing at €3.25 billion per annum (p.a.), predicted to rise by 1% p.a. up to the year 2050. They also predicted that the cost of disability care and long term care would rise by 1.2% p.a. (up to and including the year 2050) on the 2002 expenditure of €1.6 billion. In order to reduce the impact of population ageing at national and international levels, more ageing research is required so that policy makers can plan and deliver optimal services informed by relevant and critical evidence-based research that will allow them to shape healthcare delivery and social policy and to foster disease prevention with health promotion efforts and systemic reforms.

1.3. Health behaviours and ageing

Health behaviours have been defined in numerous ways but one broad definition characterises them as *`behaviour patterns, actions and habits that relate to health maintenance, to health restoration and to health improvement*' (Gochman, 1997 pp. 3). This definition encompasses not only the health-related actions required to sustain health behaviours but also considers the mental and emotional processes that determine them.

Figures from the Central Statistics Office (CSO) suggest that in Ireland, in 2011, the leading causes of death among the Irish population were diseases of the circulatory system, which accounted for 2,181 deaths in the fourth quarter of 2011 with the largest proportion of these (2,078) attributed to individuals aged 55 and older. This is the equivalent of an annual rate of 1.9 per 1,000 populations. Of those, 1,094 were due to ischaemic heart disease and 459 to cerebro-vascular disease (CSO, 2011). The known risk factors associated with these diseases include high blood pressure,

cholesterol, and diabetes all of which have been strongly associated with lack of engagement in preventive health behaviours that include not smoking or abusing alcohol.

Studies focusing on the effects of alcohol consumption on physiological functioning with advancing age have demonstrated statistically significant decreases in the relative risk of cardiovascular and all-cause mortality among persons who are classified as moderate drinkers/non-drinkers compared with those in a similar age range who are classified as harmful drinkers. There is longitudinal evidence that harmful drinkers have higher death rates than lifetime moderate drinkers and that an individual's drinking pattern is an independent risk factor for all-cause mortality and morbidity (Baglietto, English, Hopper, Powles & Giles, 2006, Breitling, Müller, Raum, Rothenbacher & Brenner, 2010, Schutte, Nichols, Brennan & Moos, 2003). There is also strong evidence that smoking is hazardous to health as it is a major risk factor for multiple chronic diseases, such as cardiovascular diseases (CVD) and cancer, as well as for cause and all-cause mortality. According to the World Health Organization (WHO), smoking is one of the ten leading risk factors for death in the world, responsible for 12% of male deaths and 6% of female deaths (Mathers, Stevens & Mascarenhas, 2009). Indeed by the end of the 21st century, a billion deaths due to smoking are expected if changes in smoking behaviour cannot be achieved (Doll, 2005).

Given these findings and with the growing number of older adults, a huge burden may be placed on the Irish health care system and therefore, the importance of maintaining good health for this population is evident. However, most of the empirical research examining patterns of health behaviours have focused on younger populations, on demographics, on structural factors or on resources flow, and have tended to ignore the health behaviours of older adults. In addition, there is a dearth of research on the meaning and beliefs that older adults assign to ageing and its consequences despite the fact that additional research of these values and beliefs may add to our understanding as to why some older adults are healthier and live longer than others.

1.4. Health behaviours and ageing self-perceptions

Ageing self-perceptions refers to the views that an individual holds regarding their own ageing and also refers to how the individual views themselves within the ageing process (Levy, Slade & Kasl, 2002a). Negative ageing self-beliefs have been associated with a downward spiral and loss of physical and cognitive functioning and these may play a role in the health status of older adults (Nelson, 2005). For example, Nelson argued that negative ageing beliefs that include fears and expectations of decline and of dependency can lead to feelings of uselessness and inevitably challenge individual desires to search for a sense of meaning, purpose and security. With regard to the health behaviours therefore, this feeling of uselessness may be a factor in the continuation of destructive behaviours such as smoking and drinking to excess.

There is longitudinal evidence that individual responsibility and a willingness to adopt a healthy lifestyle are correlated with individual beliefs regarding the consequence of personal behaviour on health outcomes (Levy, Slade, Kunkel & Kasl, 2002b). Levy *et al* demonstrated the importance of ageing self-perceptions as the key determinants providing the impetus needed to engage in a healthier lifestyle. The participants in their study who had positive ageing beliefs engaged in more preventive health behaviours, such as not smoking or drinking to excess that resulted in them living 7.5 years longer than those with more negative ageing beliefs. However, few previous studies have examined the independent relationship between ageing self-perceptions and the two health risk behaviours described above. These behaviours have largely been assessed as one of a cluster of other health behaviours. Therefore we know very little about whether or not the ways in which the older adult perceives their own ageing affect how they might regulate their health behaviours to cope with the physiological and psychological challenges associated with the ageing process. In light of this, the purpose of this study is to investigate the ways in which older adults' cognitive representations of age and ageing are associated with how they might regulate their smoking and drinking to manage the ageing process.

Chapter 2. Literature Review: Alcohol & Smoking Behaviours

2.1. Introduction

This review will examine the risks and benefits associated with alcohol use in older populations and estimate the negative health effects of smoking. It will then go on to determine the prevalence and socio-demographic correlates of alcohol and smoking behaviours among a community dwelling population. Finally the review will discuss the psychological determinants of both these behaviours and discuss how they might be associated with individual characteristics that include personal attributes such as perceptions, beliefs, values and expectations that may challenge the individual's ability to make behavioural changes appropriately.

2.2. Alcohol consumption

Public health and research has tended to focus its attentions on harmful drinking among younger alcohol users. According to a recent report, harmful use of alcohol has been cited as the third largest cause of death in the world, linking it with about 2.3 million premature, preventable deaths each year and also with about 4% of the global disease burden (Rodgers, Ezzati, Vander Hoorn, Lopez, Lin & Murray, 2004). Harmful drinking is also common among older adults and it brings a different set of problems for this age group as the older drinker differs from the younger drinker, physiologically, psychologically and socially (Agren & Berensson, 2006). Understanding the physiological and psychosocial effects of alcohol consumption in the older adult is important as the risks posed by alcohol may increase with ageing due to age-related decline in physical and cognitive capacity, a greater number concomitant co-morbid illnesses, an adverse interaction with frequently used medications, and the occurrence of negative psychosocial conditions that may leave the older person vulnerable. In addition to the risks associated with alcohol use, it is also important to understand how moderate consumption may reduce mortality and the disease burden as well as improving psychosocial functioning.

2.2.1. Alcohol consumption and the Irish context

One of the most recent population surveys to assess alcohol use in Ireland was the Survey of Lifestyle, Attitudes and Nutrition in Ireland (SLÁN) which was carried out in 2007 (Morgan, McGee, Dicker, Brugha, Ward, Shelley, Van Lente, Harrington, Barry, Perry & Watson, 2009). SLÁN 2007 was the third such national survey that looked at a variety of health behaviours of individuals aged 18 years and over on the island of Ireland.

2.2.1.1. Non-drinkers

Overall, the pattern of non-use of alcohol was 19% with higher rates of abstinence in Northern Ireland (22%). Higher rates of abstinence were also reported by older participants, 21% among 45-64 age group and 41% among the 65+ age group compared with 11% and 14% for the 18-29 and 30-44 age groups respectively.

2.2.1.2. Drinking frequency and harmful drinking

Forty five percent of men reported that they drank 2-3 times a week compared with 29% of women. In a comparison across the three SLÁN surveys, age differences in patterns of drinking were seen, with the numbers who reported drinking within the previous week increasing over each survey. In the 45-64 years age group the percentages reporting drinking in the previous week went up from 72% in 1998 to 75% in 2002 and 76% in 2007, a trend also observed in the United Kingdom (UK), according to the authors. Similarly, in the 65+ age group percentages increased from 54% in 1998 to 62% in 2002 and 73% in 2007. Additionally the study reported that this increase was most notable among women in the 45-64 year age group. The authors noted that similar trends regarding women of the same age group were observed in the UK over a similar period of time. They suggested that this pattern reflected a change in the nature of women's drinking behaviour and that this change was a cause for concern, stating that compared with men, women were more vulnerable to the effects of alcohol. Across the three SLÁN surveys, the proportion of individuals reporting having 1-2 standard drinks on a drinking occasion increased from 17% in 1998 to 27% in 2002 and 29% in 2007. However, those reporting drinking higher

numbers of drinks per drinking occasion dropped over each survey. With regard to excessive drinking, men were more likely than women to exceed the recommended weekly limits. Similarly younger drinkers were more likely than older drinkers to exceed the recommended weekly limits across all three surveys. In SLÁN 2007, 11% of men aged 45-64 exceeded recommended safe limits of 21 units per week compared with 5% of men aged 65 and over. Among women, 6% of those aged 45-64 exceeded recommended safe limits of 14 units per week compared with just 1% of women aged 65 and over.

The SLÁN surveys highlighted the age and gender differences in the drinking patterns of the Irish. The authors also noted that the majority of drinkers, particularly the middle-aged and older drinkers, were not aware that their drinking might be harming their health nor did they have a clear understanding regarding safe drinking limits. Any strategy/plan/approach aimed at reducing risky health behaviours such as harmful drinking needs to be based on an informed understanding of the factors that promote and inhibit the lifestyle choices made by older adults.

2.2.2. Physiological risks and benefits associated with alcohol in the older adult

Older people are more vulnerable to the effects of alcohol, as it may interact differently with existing chronic conditions or with medications to adversely affect health outcomes (Khan, Wilkinson & Keeling, 2006). Indeed population based studies assessing exposure-outcome relationships have identified numerous risks and benefits associated with differing levels of exposure to alcohol in the older adult that are both physiological and psychological.

2.2.2.1. Physiological risks & all-cause mortality

Longitudinal studies have shown that when health related problems increased, alcohol consumption and harmful drinking declined over the duration of the studies (Brennan, Schutte, SooHoo & Moos, 2011, Moos, Brennan, Schutte & Moos, 2005). However, these studies also demonstrated that an overall health burden predicted more subsequent harmful drinking patterns in response to stressors. In the Brennan *et al* study, harmful drinking patterns were more likely to occur in older individuals who had

a number of painful medical conditions but the authors asserted that the direction of causality between pain and harmful drinking could not be established by their study. In the Moos *et al* study, drinking problems were more likely to occur in older adults who experienced a greater overall health burden even after controlling for life history and demographic factors.

Another study demonstrated that the significant relationship between health problems and alcohol consumption patterns varied by gender (Satre, Gordon & Weisner, 2007). In the Satre *et al* study, drinking over the national recommended levels (so called harmful drinking) was associated with higher levels of engagement in adverse health behaviours that included smoking, eating high fat foods (in men), and having a higher body mass index (in women). The correlates of not drinking in this study were more health related and included poorer self-reported health, diabetes and heart problems. This finding is borne out by longitudinal evidence that poor health resulting from adverse health events reduced alcohol intake (Brennan, Schutte & Moos, 2010). The Brennan *et al* study examined the longitudinal patterns and predictors of late-life drinking trajectories and showed that over the ten years of the study engaging in risky health behaviours, such as smoking and harmful drinking in late-middle-age, increased acute negative health events in their participants at a four-year follow-up which in turn predicted lower levels of alcohol consumption in the tenth year.

In a comprehensive review of the effects of alcohol consumption on the older adult, the reviewer found that more than 60 different causes of death, which included various cancers, hypertension, cirrhosis, and pancreatitis, could be attributed to alcohol consumption either directly or indirectly (Heuberger, 2009). Heuberger found that these deaths were usually attributed to higher levels of alcohol intake and that the percentages varied widely by country and method of data collection. However, the mortality rates attributed to alcohol need to be treated with caution as former drinkers who discontinue because of health problems may inflate these figures. For example in one longitudinal study former harmful drinkers were found to have higher death rates than lifetime moderate drinkers (Schutte *et al.*, 2003). In this study, the

moderate drinkers had better health, were less likely to smoke, took fewer psychoactive medications and experienced fewer depressive symptoms than former harmful drinkers. In the United Kingdom also, a study that examined the effects of alcohol intake on all-cause mortality in older adults over a 23-year period, found that those who consumed any levels of alcohol had decreased mortality compared with non-drinkers (Paganini-Hill, Kawas & Corrada, 2007). Those who consumed alcohol throughout the study had a significantly decreased risk of death compared with non-drinkers, as did those who started drinking prior to follow-up. Women who stopped drinking during the study had an increased risk of death. However, this study failed to assess the baseline health status of their participants, which might explain some of the variation in their findings. One study that did determine whether alcohol had the same association with mortality in healthy and unhealthy older people found that between the unhealthy groups, occasional and moderate alcohol consumption was associated with lower mortality compared to never-drinkers while the same associations were not found between the healthy groups (Sun, Schooling, Chan, Ho, Lam & Leung, 2009). However in later studies that adjusted for health status factors, non-drinkers and harmful drinkers showed increased mortality risks compared to moderate drinkers (Holahan, Schutte, Brennan, Holahan, Moos & Moos, 2010).

2.2.2.2. Physiological benefits

Epidemiologic studies have consistently demonstrated a U- or J-shaped association between moderate alcohol consumption and coronary heart disease (CHD) when compared with that of non-drinkers (Bryson, Mukamal, Mittleman, Fried, Hirsch, Kitzman & Siscovick, 2006, Burke, Zhao, Lee, Hunter, Spargo, Gracey, Smith, Beilin & Puddey, 2007, Ferreira & Weems, 2008, Mukamal, Chung, Jenny, Kuller, Longstreth Jr, Mittleman, Burke, Cushman, Psaty & Siscovick, 2006). In a 10-year longitudinal study, Bryson et al found even when controlling for incidences of myocardial infarction, moderate alcohol use was associated with a lower risk of coronary heart failure. Consistent with this, Mukamal et al found the lowest risk of CHD associated with the consumption of 14 or more units per week. However, a study of Aboriginal Australians established that alcohol consumption alone did not predict CHD, but a clustering of

adverse behaviours such as poor diet; poor smoking habits and harmful drinking significantly increased the risks of CHD (Burke *et al.*, 2007). In a meta-analysis of over 100 studies carried out across 25 countries, Ferreira & Weems (2008) found evidence consistent with these previous findings as well as evidence that moderate alcohol consumption reduced the risk factors for ischaemic heart disease.

Numerous studies also suggest a positive relationship between light to moderate alcohol consumption and a reduction in the risk factors and incidence of cardio-vascular disease (CVD). In a longitudinal study of 43-84 year old adults, moderate alcohol consumption was protective against hearing loss working through a CVD pathway, while a history of harmful drinking was associated with an increase in the odds of having a high frequency hearing loss (Popelka, Cruickshanks, Wiley, Tweed, Klein, Klein & Nondahl, 2000). In America (USA), moderate alcohol consumption was also associated with better self-perceived health status, improved cardiovascular health, and lower rates of hospitalisations in women but not men (Balsa, Homer, Fleming & French, 2008). In their meta-analysis, Ferreira & Weems showed that moderate alcohol consumption in diabetic men lowered the levels of inflammation markers and thus blocking a mechanism through which CVD may occur. Other diseases of the vascular system, such as vascular dementia, are also ameliorated by moderate alcohol consumption whereas immoderate or chronic alcohol intake exacerbated them (Ferreira et al., 2008)

While alcohol consumption in moderation has been shown to reduce the risk of developing physical disability in older adults in good health but not in those in poor health (Karlamangla, Sarkisian, Kado, Dedes, Liao, Kim, Reuben, Greendale & Moore, 2009), other studies have demonstrated different outcomes. In one study, general health status was significantly associated with drinking status with moderate drinkers having significantly better health overall than non-drinkers and harmful drinkers had poorer functional health than low-risk drinkers (Blow, Walton, Barry, Coyne, Mudd & Copeland, 2000). Similarly, individuals who abstain from alcohol use reported their physical and functional health as poorer than those who drank alcohol (Resnick, Perry, Applebaum, Armstrong, Cotterman, Dillman, Elliott, McCarthy, Narrett, Parrish &

Parrish, 2003). In addition, a significantly reduced risk of functional health was associated with occasional and light drinking (Chen & Hardy, 2009). Nevertheless, in a systematic review, Reid et al (2002) found variability in studies that examined functional impairment. The review included studies that showed how having a history of alcohol abuse or higher levels of alcohol consumption per day (so called binge drinking) and consuming ≥10 units per week were associated with greater risk of functional disability. On the other hand, another study in the review found that men (but not women) had an increased risk for functional disability if they consumed ≥14 units per week. While several other studies in Reid's review failed to demonstrate any association between alcohol consumption and functional disability, two further studies demonstrated that increased alcohol consumption actually reduced the risk for functional impairment.

Whilst moderate consumption of alcohol has been shown to decrease the risk of vascular events, improve mortality risks, decrease morbidity and increase quality of life by reducing the risk of psychological distress, in the older adult, adverse events can occur even with moderate drinking. In one study, moderate alcohol consumption was associated with an increased risk of adverse drug reactions adjusting for potential confounders (Onder, Landi, Della Vedova, Atkinson, Pedone, Cesari, Bernabei & Gambassi, 2002). Alcohol use is also responsible for many medical problems, including liver cirrhosis (Andersen, Sonne, Sletting & Prip, 2000, Makimoto, Oda & Higuchi, 2000), acute pancreatitis (Gupta, Wang, Holly & Bracci, 2010), gastrointestinal bleeding (Heuberger, 2009), metabolic complications (Buja, Scafato, Sergi, Maggi, Suhad, Rausa, Coin, Baldi, Manzato, Galluzzo, Enzi & Perissinotto, 2010, Lee, Park, Kang & Lee, 2011), malignancies (Makimoto *et al.*, 2000) and psychiatric disorders (Graham, Massak, Demers & Rehm, 2007, Haynes, Farrell, Singleton, Meltzer, Araya, Lewis & Wiles, 2005, Satre, Sterling, MacKin & Weisner, 2011). While, it is assumed that older adults report less alcohol use than younger adults and that alcohol consumption decreases with age, the reasons for the decline in consumption are numerous but are usually connected to changes in life circumstances and increasing ill health (Hajat, Haines, Bulpitt & Fletcher, 2004).

2.2.3. Psychological & psychosocial effects of alcohol in an older population

While there are a variety of reasons why people may initially engage or continue to engage in daily alcohol use, the most commonly cited reasons in the literature are to feel good or to lessen negative feelings like stress or anxiety. Psychological and social factors such as these are important as they are implicated in sustaining harmful use of alcohol.

2.2.3.1. Psychological & psychosocial effects

With regard to the psychological effects, current alcohol use or a lifetime history of alcohol use may lead to mental health problems in older adults (Oslin, 2000). Research has increasingly recognised the co-occurrence of affective disorder (major depression or mood disorders) and alcohol use disorders among depressed individuals (Oslin, 2000, Satre *et al.*, 2011). In general, studies have shown that harmful drinkers have poorer mental health and have very high rates of major depression compared with those in the moderate drinking and non-drinking categories (Blazer, Hays & Musick, 2002, Blow *et al.*, 2000, Sacco, Bucholz & Spitznagel, 2009). In a large population survey, depression was significantly related to harmful drinking, with this effect stronger for women than for men (Graham *et al.*, 2007). This study also found evidence that while former drinkers had slightly higher rates of major depression and reported more depressive episodes than moderate drinkers, there was no evidence that moderate drinking, when compared with non-drinking, was protective for affective disorders. Other studies found that more men than women, with depressive symptoms and poor functional health, report harmful drinking patterns (Choi & Dinitto, 2011, St. John, Montgomery & Tyas, 2009). Furthermore a large longitudinal survey reported that both non-drinkers and harmful drinkers were more likely to develop depression than moderate drinkers. However, another study found no association between harmful drinking and the onset of depression or anxiety, but did find a significant association between being a non-drinker and having a lower risk of depression or anxiety (Haynes *et al.*, 2005). Therefore, the relationship between drinking status and mood affective disorders remains speculative. Nevertheless, a recent longitudinal study outlined a causal model which suggested that it was the

nature of the problems with alcohol that led to an increased risk of major depression rather than using alcohol for self-medication to relieve the symptoms of anxiety or depression (Fergusson, Boden & Horwood, 2009). The authors of this study suggest that alcohol's depressant characteristics might explain mood affective disorders in those individuals who are harmful drinkers.

2.2.3.2. Psychological & psychosocial benefits

Psychosocial benefits associated with low to moderate alcohol consumption have also been documented. The social environment where alcohol is consumed provides a chance for friends and family to get together and relax in each other's company. For the older adult particularly, this can be a chance to break a cycle of isolation brought about by losses arising out of reduced mobility, loss of independence, and diminished social contacts (Ferreira *et al.*, 2008). In a national longitudinal survey of Australian women, moderate alcohol intake was found to be beneficial for older women in terms of survival and mental health-related quality of life (Byles, Young, Furuya & Parkinson, 2006). In a large cross-sectional population survey carried out in Ireland, adapting a healthier lifestyle that included moderate alcohol consumption was found to be associated with lower levels of psychological distress as well as improved quality of life in their population of interest (Conry, Morgan, Curry, McGee, Harrington, Ward & Shelley, 2011). In the light of the above findings, it is important to identify the factors that determine the patterns of alcohol consumption in middle-aged and older adults in order to inform health interventions where needed and to support salutary use of alcohol in later life.

2.2.4. Patterns and determinants of alcohol use in older adults

Patterns of alcohol consumption, such as harmful drinking and alcohol dependence, pose a special risk for the older adult. It is important to detect and address harmful drinking in older adults as they are more likely than younger people to have compromised physical health and functioning, to take more prescription medications and to have slower rates of metabolism to break down alcohol. As a result, harmful

drinking in this population lead to decreased longevity and increased morbidity (Moos, Brennan, Schutte & Moos, 2004).

2.2.4.1. Socio-demographic patterns & determinants

Population based studies assessing the association of socio-demographic variables to older adults' drinking behaviour reveal mixed evidence. Cross-sectional and longitudinal studies have documented increases in abstention and decline in alcohol consumption among older adults with increasing age (Barnes, Moore, Xu, Ang, Tallen, Mirkin & Ettner, 2010, Immonen, Valvanne & Pitkala, 2011, Lai, 2004, Molander, Yonker & Krahn, 2010, Moore, Karno, Grella, Lin, Warda, Liao & Hu, 2009, Moos *et al.*, 2005, Moos, Schutte, Brennan & Moos, 2009, Morgan *et al.*, 2009, Platt, Solan & Costanzo, 2010, Sacco *et al.*, 2009, Snow, Murray, Ekuma, Tyas & Barnes, 2009). However, the age-related decline in alcohol consumption found in these studies might be explained by selective mortality whereby harmful drinkers die prematurely from alcohol related diseases leaving behind individuals who are less susceptible to the effects of alcohol due to their moderate drinking patterns (Brennan *et al.*, 2010, Reid, Boutros, O'Connor, Cadariu & Concato, 2002). Age related decline might also be explained by a cohort effect whereby older harmful drinkers have either a history of harmful drinking or they belong to a particular birth cohort where higher levels of alcohol consumption are considered normal.

Longitudinal studies considering the question regarding cohort effects assessed whether established age differences in drinking trends might be influenced by other factors that are both time-related and historically influenced (Ahacic, Kennison & Kåreholt, 2012, Bjork, Thygesen, Vinther-Larsen & Gronbaek, 2008, Morgan *et al.*, 2009). The researchers examining this question found period and cohort effects suggesting that the changes related to drinking patterns were predicted by social and cultural influences in their populations of interest. While women in these studies continued to drink less than men, within their own age cohorts younger women drank more than older women. Therefore although studies have consistently shown that drinking patterns also differ by gender, period and cohort effects also need further consideration.

Nonetheless, studies have shown that among men and women of all ages, men display higher alcohol use patterns than women (Bobrova, West, Malyutina, Malyutina & Bobak, 2010, Castro-Costa, Ferri, Lima-Costa, Zaleski, Pinsky, Caetano & Laranjeira, 2008, Immonen *et al.*, 2011, Isralowitz, Spiegel, Reznik, Borkin & Snir, 2009, Kim, 2012, Menon, Katz, Mukamal, Kestenbaum, de Boer, Siscovick, Sarnak & Shlipak, 2010, Molander *et al.*, 2010, Moore *et al.*, 2009, Moos *et al.*, 2009, Sacco *et al.*, 2009, Wilsnack, Wilsnack, Kristjanson, Vogeltanz-Holm & Gmel, 2009), although as the younger cohort of women age, the gap between the sexes may narrow and even disappear.

Castro-Costa et al (2008) also reported that younger (<60), wealthier males were more likely than other participants to report harmful drinking behaviours. Being male and having a history of harmful drinking beyond recommended guidelines also leads to a decreased rate of variability in alcohol consumption compared with the drinking patterns of other alcohol consumers (Brennan *et al.*, 2010).

Other studies found that the variability in differences found in the patterns of alcohol consumption between men and women were dependent on other socio-demographic factors such as ethnicity (Ruchlin, 1997), education and marital status (Moos, Brennan, Schutte & Moos, 2010a), as well as the individual health status, levels of social engagement and the presence of depression (in men) (Choi *et al.*, 2011).

In one study of marriage breakdown, harmful drinking was more prevalent among those who are divorced, or separated (Lai, 2004, Moore *et al.*, 2009, Platt *et al.*, 2010), while non-drinkers and moderate drinkers were more likely to be married (Snow *et al.*, 2009). The former finding was supported by a study of the patterns of alcohol consumption of Thai men which found that individuals who drink alone are more likely to be dependent on alcohol (Hajat *et al.*, 2004). On the other hand, other studies noted that harmful drinking was associated with living with a spouse as well as being younger, male, a current smoker and having a higher level of education (Barnes *et al.*, 2010, Immonen *et al.*, 2011).

As well as age and gender, other socio-demographic characteristics may shape the drinking behaviour of older adults. For instance, having a higher income was

associated with harmful drinking and alcohol dependence (Castro-Costa *et al.*, 2008, Platt *et al.*, 2010). Consistent with this, studies assessing the relationship between the length of time spent in education and alcohol consumption, found that individuals with a higher educational attainment and an increased likelihood of being in a higher income category, were more likely to increase their alcohol consumption over time (Immonen *et al.*, 2011, Platt *et al.*, 2010). In addition to an increase in alcohol consumption associated with higher income and education levels, other at-risk behaviours such as drink-driving have also been associated with this group of individuals (Alameida, Harrington, LaPlante & Kang, 2010). Consistent with this, individuals with a high socio-economic status (SES) were more likely to report a higher daily alcohol intake than those in the low and middle SES (Burger, Mensink, Bergmann & Pietrzik, 2003). Conversely, other studies have found it was a lower level of educational attainment, with a higher likelihood of being in a lower income category, that was more predictive of harmful drinking (Molander *et al.*, 2010, Sacco *et al.*, 2009) compared with those who spend more time in education (Barnes *et al.*, 2010, Dufouil, Ducimetière & Alpérovitch, 1997, Ruchlin, 1997). There are also socio-cultural differences in the drinking styles of men and women. In cultures where women are expected to drink less than men, there is a larger gap in drinking patterns between genders (Bobrova *et al.*, 2010).

2.2.4.2. Other determinants of harmful drinking

Attitudes to drinking or positive alcohol expectancies (PAE) play a role in mediating the relationship between ageing and drinking patterns (Bacharach, Bamberger, Sonnenstuhl & Vashdi, 2008). Individuals who hold positive expectations about the role that alcohol plays in sustaining their moods and emotions are more likely to report harmful drinking patterns compared with those with negative alcohol expectancies. Consistent with this, individuals who believe that moderate alcohol use is good for their health but who define moderate use above recommended guidelines, are more likely to be harmful drinkers (Masters, 2003). In the context of life events, harmful drinking has been associated with the loss or death of a family member or friend and emotional distress (Lemke, Brennan, Schutte & Moos, 2007). Positive drinking norms

of friends or family, or an over-reliance on substances to reduce tension or pain increases one's likelihood of harmful drinking (Moos *et al.*, 2010a, Moos, Schutte, Brennan & Moos, 2010b). In addition, depressive symptoms, poor health or perceived poor health were risk factors for reporting harmful drinking (Brennan *et al.*, 2010, Kirchner, Zubritsky, Cody, Coakley, Chen, Ware, Oslin, Sanchez, Durai, Miles, Llorente, Costantino & Levkoff, 2007, Molander *et al.*, 2010). Whilst it is clear that there are both physical and mental health risks associated with harmful drinking, the relationship between alcohol consumption and all health outcomes is a complex one. However, there is a clearer dose–response relationship with smoking and all-cause morbidity and mortality.

2.3. Smoking

Smoking is another commonly used psychoactive drug. However, public health and research has tended to focus its attentions on the smoking behaviour of younger populations. Nevertheless, cigarette smoking is the leading cause of premature death among older adults. Half a million people in the European Union (EU) die from the effects of smoking each year with half of these deaths occurring in middle-aged or older adults and the highest percentage of them associated with CVD (Agren *et al.*, 2006). Although there are substantial benefits to being a never smoker or a long-term quitter, with research clearly demonstrating how they have a longer life expectancy and are expected to have more disability-free years of life, smoking prevalence remains high (Agren *et al.*, 2006). Over the next decades, given the expected increase of the older population, there is a need to get a clearer picture of the role that physiological, psychological, socio-demographic, personal, and socio-cultural factors play in smoking behaviour.

2.3.1. Smoking and the Irish context

The SLÁN surveys also assessed smoking in Ireland with the most recent survey carried out in 2007 (Brugha, Tully, Dicker, Shelley, Ward & McGee, 2009). This was the third such survey with the first survey completed in 1998 (Shiely & Kelleher, 2004)

2.3.1.1. Smoking rates

Just over half of SLÁN 2007 respondents reported that they had never smoked (52%) with 48% of them reporting that they were either current or former smokers. Within the latter two groups, the highest rates were reported by those aged 30-44 and 45-64 years. Of the 29% who reported being current smokers, men reported higher rates (31%) than women (27%) with this pattern persisting across all age groups.

In a comparison across the three SLÁN surveys (1998, 2002 & 2007), age group differences in rates of smoking were consistently seen with the lowest rates noted in the 45-64 and the 65+ years age groups compared with the younger members of the population of interest. In the 45-64 years age group higher rates of smoking were observed among men in 1998 (29%) compared with 26% of women. However, in 2002 and 2007 this was reversed with more women than men smoking across these two surveys. Those in the 65+ age groups had the lowest smoking rates of all respondents with men smoking marginally more than women across all three surveys.

2.3.1.2. Smoking cessation rates

Rates of reduction in smoking across two of the three surveys fell from 33% in 1998 to 27% in 2002, with similar rates of reduction seen for both men and women and all age categories. However, in spite of the introduction of the workplace smoking ban in Ireland in April 2004, no significant changes in smoking rates between 2002 and 2007 (29%) were seen. The authors noted that these findings may be linked to the lack of Irish tobacco control measures following the ban. They argued that when the same workplace smoking ban was introduced in the United Kingdom (UK) in 2007, a 22% reduction in smoking rates was noted one year on with a further 23% increase in the number of people who had set a cessation date compared to that of the previous year.

The authors also noted that in addition to the lack of tobacco control measures, other barriers to quitting were evident. In SLÁN 2007 more men than women had succeeded in quitting (23% vs. 16%) and more women than men feared that there would be negative consequences to quitting, such as gaining weight. Mental health was also

strongly associated with smoking, with current smokers being 2-3 times more likely to report psychological distress or to suffer from a generalised anxiety disorder.

The SLÁN surveys highlighted some age and gender differences in the smoking patterns of the Irish. It also highlighted that gender and mental health were factors to be considered in the development of any strategy/plan/approach that is aimed at reducing/eliminating smoking behaviour.

2.3.2. Factors and consequences associated with smoking in the older adult

Population based studies assessing exposure-outcome relationships have identified smoking as an important preventable risk factor in the burden of disease and for high levels of mortality in older adults, with older tobacco users having nearly twice the mortality rate of never smokers (Donze, Ruffieux & Cornuz, 2007). Even at an advanced age, there are notable benefits to quitting smoking but behavioural changes at an individual level can have a limited impact. However, despite evidence that the adverse consequences to smoking disproportionately affect an older population due to their increasing years and the duration of their smoking habit, smoking cessation attempts decline with age (Brugha *et al.*, 2009, Burns, 2000). Smoking-related illnesses are also more prevalent in the older adult and they are more likely than younger smokers to underestimate the risks to their health (Yu, Chen, Kim & Abdulrahim, 2002). Therefore what is needed is a fuller understanding of the numerous risks associated with smoking in this particular population as well as a discussion of the benefits to quitting regardless of age.

2.3.2.1. Cause and all cause morbidity and mortality associated with smoking

There is an increasing body of evidence that being a never smoker not only increases longevity, but also increases the number of years living a healthy life. The Burns (2000) finding that increasing age and duration of smoking leads to a steady increase in the rates of disease incidence, was borne out by a longitudinal study which showed that smoking reduces the length of time that one can expect to live in good health while increasing the length of time spent in poor health (Bronnum-Hansen & Juel, 2001). There also seems to be a dose-response relationship with smoking and functional

ability (Støvring, Avlund, Schultz-Larsen & Schroll, 2004). In this study, former smokers had an increased risk of reduced functional ability by the age of 75 years compared with those who never smoked. This dose-response relationship has also been confirmed in other longitudinal studies. For example, health related quality of life was predicted by an increase in the number of cigarettes smoked in a dose dependent manner (Strandberg, Strandberg, Pitkälä, Salomaa, Tilvis & Miettinen, 2008). In addition, another study noted that health status, using a frailty index, decreased exponentially with age, with heavy smokers being the most frail and with the highest mortality rates compared to light smokers or never smokers (Hubbard, Searle, Mitnitski & Rockwood, 2009). However, another longitudinal study carried out with a much larger population, found that while never smoking was related to extra years of healthy living, without disability, individuals who had quit smoking at least 15 years prior to the baseline survey, had a similar number of healthy years to never smokers (Østbye & Taylor, 2004). As well as functional health, smoking also impacts other aspects of health.

Cross-sectional and longitudinal studies have shown a clear association between respiratory health and smoking. One study noted that although asthma is prevalent in an older population, current smokers are more at risk of developing asthma, having bronchial hyper-responsiveness (Kim, Kim, Tak, Jee, Lee, Park, Jung, Bahn, Chang, Choi, Chang, Min, Kim & Cho, 2002) or lower respiratory tract diseases (Hsu & Pwu, 2004). Hsu & Pwu also found that over the duration of their study, current smokers had a higher risk of stroke. In a Canadian study that estimated the number of smoking related diagnoses and days in hospital attributable to smoking, it showed that ischaemic heart disease accounted for 21% of hospital days and was the largest single category followed by lung cancer at 9% of hospital days. In the year of the review, the authors noted that hospital acute care days that were smoking-attributable cost over $2.5 billion Canadian dollars in 2002. Other cancer incidences have also been positively associated with smoking, with current smokers more likely to receive a cancer diagnosis than never smokers, particularly in areas that include specific sites such as the head and neck region; upper gastrointestinal tract, hepatobiliary and pancreatic cancer, and bladder/renal pelvis cancer (Shankar, Yuan, Koh, Lee & Yu,

2008). Within this study, there was a statistically significant risk reduction for smoking-related cancers for those individuals who had quit smoking but the reduction was dependent on the number of years of smoking cessation. Another benefit to former-smokers was that relative to current smokers, in addition to reduced cancer incidences, they also had improved mortality rates. The issue of mortality and smoking has been well assessed by other studies.

A systematic review and meta-analysis of 17 studies in seven countries, examined the empirical evidence on the association of smoking with all-cause mortality in individuals aged 60 years and older (Gellert, Schottker & Brenner, 2012) and found that in all the studies identified, current smoking was associated with increased all-cause mortality. Like previous studies, the authors noted a dose-response relationship with the amount of cigarettes currently smoked and premature death from a range of diseases, the most prevalent being deaths due to lung cancer and chronic obstructive pulmonary disease (COPD). The review observed that compared to never smokers, current smokers had an 83% increased mortality risk and former smokers a 34% increased mortality. In the case of former smokers, relative mortality decreased based on time since cessation relative to that of never smokers, highlighting the benefits of smoking cessation for all age groups.

2.3.2.2. Benefits to quitting smoking in the older adult

The health benefits to quitting smoking are numerous, even at a late age. There is longitudinal evidence that there are immediate improvements in circulation and that damage done to lungs begins to repair (Taylor, Hasselblad, Henley, Thun & Sloan, 2002). According to Taylor *et al*, after just one year, the risks for heart disease are halved, and there is a diminished risk of stroke, lung disease, and cancer. The benefits of quitting were also highlighted for women in another study with twice the improvement in lung function seen for middle aged, former female smokers with mild to moderate COPD over and above that of men who quit during the same period (Connett, Murray, Buist, Wise, Bailey, Lindgren & Owens, 2003). Individuals who cease smoking also have a decreased risk of hospitalisation for smoking related conditions once a smoke free period of between one and three years has elapsed (Baumeister,

Schumann, Meyer, John, Volzke & Alte, 2007). Studies have also demonstrated better physical functioning and quality of life in older former smokers compared with current older smokers (Hubbard *et al.*, 2009, Husten, Shelton, Chrismon, Lin, Mowery & Powell, 1997). In addition to the health benefits identified above, smoking cessation at any age reduces the risk of death.

There are mortality benefits associated with smoking cessation for both men and women of all ages, with smokers who stop smoking expected to live longer as they are less likely to develop tobacco-related diseases, including coronary heart disease, cancer, and pulmonary disease (Vollset, Tverdal & Gjessing, 2006). Additionally, these benefits can be seen even after the development of smoking-related diseases, such as coronary heart disease or COPD. Indeed one study showed that the excess risk for all-cause mortality in former smokers decreased within five years after smoking cessation and eventually reached a level that was almost equivalent to that of never smokers (Ikeda, Ninomiya, Doi, Hata, Fukuhara, Matsumoto & Kiyohara, 2012). The Taylor *et al* study also showed that individuals who quit at age 65 gained 1.4 to 2.0 years of life in the case of men and 2.7 to 3.4 years in the case of women. Similarly, a large American population based study of adults aged 25 to 79 years of age, showed that those who had quit smoking between the ages of 45 to 54 gained about six years of life compared with those who continued to be smokers (Jha, Ramasundarahettige, Landsman, Rostron, Thun, Anderson, McAfee & Peto, 2013). Despite the previously outlined benefits to quitting smoking, smoking in older people persists. Therefore it is worth improving our understanding of factors that contribute to continued smoking and cessation in the older adult in order to be able to develop strategies that lead to smoking behaviour change.

2.3.3. Determinants of smoking and smoking cessation

Epidemiological studies have recognised that the excess risk of premature death is halved in smokers who quit when they are between 65‑70 years old (Agren *et al.*, 2006). The next section will assess the characteristics of older smokers to determine the factors associated with tobacco dependence, and identify the characteristics of older smokers who successfully quit.

2.3.3.1. Socio-demographic patterns & determinants of smoking and smoking cessation

Population based studies assessing the association of socio-demographic variables to older adults' smoking behaviour reveal mixed evidence. According to the Organization for Economic Co-operation and Development (OECD), in 2010 the daily smoking rates in some western European countries, for adult men and women (ages 15 and older) were similar (OECD, 2013). For example, the proportions of both male and female daily smokers in Norway were 30%, in Ireland it was 34% and 28% (respectively) and 33% and 28% (respectively) in the Netherlands (Figure 2.1). However in some member countries, there were significant differences in the smoking rates of men and women particularly in Latvia, Lithuania, Cyprus, Bulgaria, Romania and Turkey with the highest smoking rates seen for men. In addition, although smoking rates declined in most countries, the decline was more marked for females in some OECD countries. The findings with regard to the differences in the rates of smoking cessation between men and women vary with some studies demonstrating no difference between the sexes (Henderson, Rhoades, Henderson, Welty & Buchwald, 2004, Levy, Romano & Mumford, 2005, Sachs-Ericsson, Schmidt, Zvolensky, Mitchell, Collins & Blazer, 2009), while other studies demonstrate greater success among men (Brugha *et al.*, 2009, Husten *et al.*, 1997). In general, the OECD report noted that smoking prevalence in all member countries was higher for men except for Sweden. These differences in smoking rates found in OECD countries might be explained by factors other than gender alone such as a simple reduction of smoking initiation, particularly among women, or an increase in smoking cessation in the countries identified arising out of improved tobacco control policies. However, because smoking prevalence rates are so diffuse throughout and within these different countries, it is worth examining the influence that other socio-demographic variables might have on smoking behaviour.

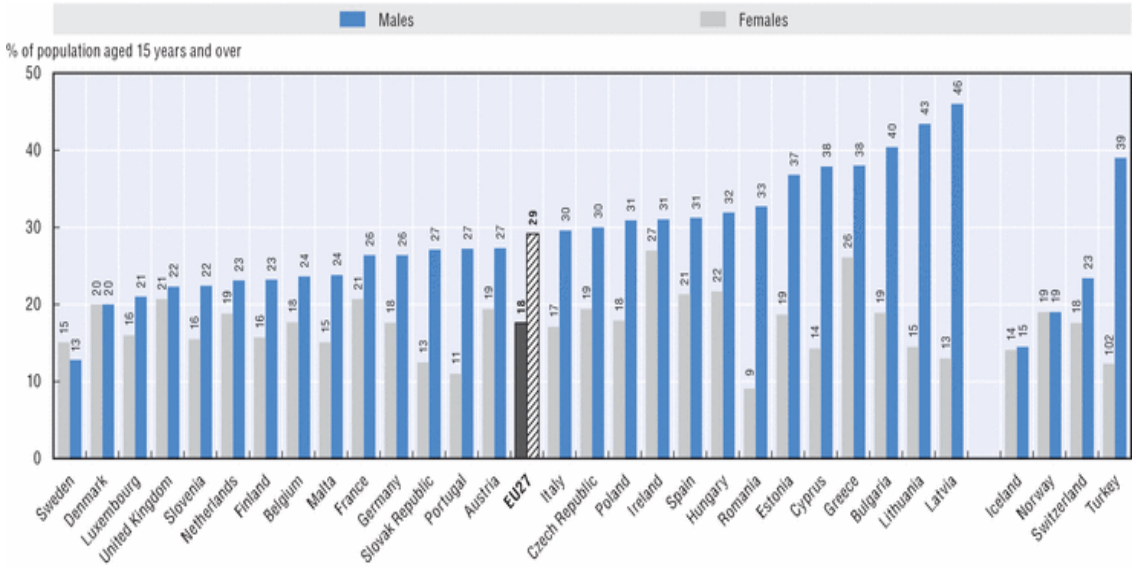


Figure 2-1: Adult population smoking daily by gender in OECD countries (Percentage, 2010 or latest available year): Source: OECD Health Data 2012

Age is another factor associated with smoking behaviour. However, research has principally examined this question in relation to younger populations and therefore we know very little about the smoking behaviour of older adults (Donze *et al.*, 2007). Nonetheless, studies which have included older adults in their population of interest have noted that there are fewer current smokers among members of the older population (Brugha *et al.*, 2009, Burns, Lee, Shen, Gilpin, Tolley, Vaughn & Shanks, 1997, Drum, Shiovitz-Ezra, Gaumer & Lindau, 2009). This decreasing trend in smoking intensity has been noted in males aged 65 years and older (Drum *et al.*, 2009) and among females where the decision to smoke was negatively associated with advanced age (Lin, 2010). One further study observed that for both men and women, age was negatively associated with smoking, with the odds of smoking declining steeply as age increased (Kim, De La Rosa, Rice & Delva, 2007). Burns *et al* suggested that this decline in the prevalence of ever smokers into older ages might be explained by the greater mortality rates for those individuals who ever smoked compared with those who never smoked. This has been supported by findings that older smokers make fewer quit attempts than younger smokers, putting them at a higher risk of dying from smoking related diseases (Burns, 2000, Donze *et al.*, 2007). Equally, in the SLÁN 2007 survey the number of quitting attempts decreased with age with over half (54%) of the

younger participants reporting a quit attempt over the last 12 months compared with just 30% of smokers aged 65 and over (Brugha *et al.*, 2009).

In addition to gender and age differences, cultural differences have also been observed in the smoking behaviour of men and women of all ages. For example, in cultures where there is a stigma attached to smoking among women, and where it is condoned among men, women either never start smoking or they smoke considerably less than men (Kim *et al.*, 2007, King, Polednak, Fagan, Gilreath, Humphrey, Fernander, Bendel & Noubary, 2006). Education, marital status and social class have also been shown to be significant predictors of smoking behaviour. In men, current smokers are more likely to be found in a low education category (Zheng, Fu, Lu, Ji, Hovell & Fu, 2008) and a lower social class category (van Loon, Tijhuis, Surtees & Ormel, 2005). Other studies have consistently shown that having a higher level of education decreases the likelihood of smoking and increases the probability of quitting (King *et al.*, 2006, Lin, 2010). Positive smoking outcomes are also more likely to be seen among those in a higher income category and those who are married (Giordano & Lindström, 2011, King *et al.*, 2006), while current smokers who are widowed or divorced are more likely to be women (Zheng *et al.*, 2008). The identification of socio-demographic factors as having a positive role to play in smoking cessation has been persistently seen in studies of the smoking behaviour of younger people but once again few studies have examined the characteristics of smoking cessation in older adults. What little is known will be reviewed next.

2.3.3.2. Determinants of smoking cessation in older adults

Although older adult smokers make fewer attempts at quitting than younger smokers they are more likely than younger smokers to succeed when they do (Levy *et al.*, 2005). Those who do make quit attempts are by and large the heavy smokers or the very light smokers according to Levy *et a*l (2005). Smoking history, which includes the number of cigarettes smoked per day, smoking duration and previous quit attempts, go some way to determining the probability of successfully quitting (van Loon *et al.*, 2005). van Loon *et al* found that in their study the number of cigarettes consumed in one day by men predicted smoking cessation whereas in women, smoking longevity

was negatively associated with smoking cessation. Research also suggests that poor health is predictive of smoking cessation. A study which examined the relationship between clinical factors and smoking cessation found that participants with a history of diabetes were more likely to quit than those without diabetes (Henderson *et al.*, 2004). In addition, having a poor self-rated health status or an understanding regarding the harmful effects of smoking, reduces the probability of initiation and increases the rate of quit attempts (Lin, 2010, Sachs-Ericsson *et al.*, 2009). Sachs-Ericsson, *et al* also noted that health problems combined with higher levels of psychological distress increases motivation to quit.

However mental health has also been identified as an obstacle to quitting. As was noted in the SLÁN surveys, current smokers are 2-3 times more likely to report psychological distress or to suffer from a generalised anxiety disorder (Brugha *et al.*, 2009). High levels of psychological distress have also been reported by current smokers who have no plans to quit due to addiction or because of past failure at quitting and who stated that smoking was used either as a form of relaxation or to deal with stress (Leung, Gartner, Dobson, Lucke & Hall, 2011). Excessive worrying has also been highlighted as a barrier to quitting. Having strong concerns regarding one's own health combined with high self-efficacy is a predictor of quitting activity (Dijkstra & Brosschot, 2003). In Dijkstra & Brosschot's longitudinal study they showed higher quitting activity among smokers who reported strong concerns regarding the health effects of smoking and who scored high on self-efficacy. This was contrasted with relapse in ex-smokers with low self-efficacy despite their strong concerns about the negative effects of smoking. This notion that worry can motivate current smokers to quit and cause relapse in ex-smokers was supported by the findings of another study, which found that older people concerns regarding the potential health risks from smoking cessation aids was an obstacle to quitting (Kerr, Watson, Tolson, Lough & Brown, 2004). In the same study, older adults reported no quit attempts or they relapsed based on a belief that no health benefits could be gained from quitting at an advanced age. In addition to all the determinants of smoking cessation outlined above another recognised barrier to quitting is the presence of other risky behaviours. Across the adult lifespan, both tobacco use and excessive alcohol consumption have

been identified as key risk factors for chronic disease and health burden (Burns, Birrell, Steel, Mitchell & Anstey, 2013). However the combined effect of these two lifestyle factors remains unclear (Xu, Zhang, Gao, Xiang, Gao, Zheng & Shu, 2007).

2.4. Interrelationship between the health behaviours

According to the World Health Organisation (WHO), in Europe in the 20th century there was a shift away from communicable to non-communicable diseases as the main causes of death and disability with alcohol, and smoking being among the highest risk factors for diseases such as cancer, diabetes, cardiovascular and respiratory diseases, all of which lead to disability, dependence and death (Kanström , Zamaro, Sjöstedt & Green, 2008). It is worth considering the interactive effect of these behaviours as most people tend to engage in several risky behaviours at any one time (Conry *et al.*, 2011, French, Rosenberg & Knuiman, 2008).

However the extent to which the above health behaviours are inter-related and how that relationship is influenced by other factors such as socio-demographic characteristics, health status or psychological status, is not well-documented and study findings have been variable. Nonetheless, socio-demographic characteristic differences have been associated with the number of risky behaviours exhibited. For example, in one longitudinal study carried out over four waves, women aged 40 years and older on high incomes, were more likely to engage in a lower number of risky behaviours and at lower levels compared with older men, who were more likely to be harmful drinkers and to take inadequate levels of physical activity. Being younger, male and divorced or separated has also been associated with the adoption of more risky behaviours (French *et al.*, 2008, Moore *et al.*, 2009). Conversely, another study found that risky behaviours were prevalent among men, older age groups and those with higher education attainment, but those who were employed engaged in fewer risky behaviours (Chou, 2008). In addition, women who were harmful drinkers and smokers were less likely to engage in physical activity (Moore, Morgenstern, Harawa, Fielding, Higa & Beck, 2001). The socioeconomic differences found in the prevalence of head and neck cancer in a Brazilian population was partially attributed to levels of

alcohol consumption and smoking rates (Boing, Ferreira Antunes, de Carvalho, de Góis Filho, Kowalski, Michaluart, Eluf-Neto, Boffetta & Wunsch-Filho, 2011).

A systematic review of health behavioural risks and cognitive health in older adults demonstrated that overall physical activity and moderate alcohol consumption was protective against dementia and cognitive impairment, whereas smoking increased the risk of Alzheimer's disease (Lee, Back, Kim, Kim, Na, Cheong, Hong & Kim, 2010). Finally, studies have also suggested a complex interaction between emotions such as depression and anxiety with healthy and unhealthy behaviours (Anton & Miller, 2005). Given the abundant evidence linking health behaviour patterns to CVD, diabetes, and cancers, it is also necessary to assess the psychological antecedents of these health-risk behaviours.

2.4.1.1. Psychological determinants of health behaviours

The degree to which a person feels that they have control over their own health is reflected in their own personal pre-disposition and in social resources (Angel, Angel & Hill, 2009). Participants in the Angel *et al* study who reported low levels of control also reported higher levels of distress and fair or poor general health, and were more likely to engage in two or more risky health behaviours. These findings were mitigated by age, education and the number of chronic health conditions, all of which emerged as strongly correlated with the individual's sense of their own ability to improve their health by changing the number of risky health behaviours that they were engaged in. Individuals who believed in their capacity to manage their own health were less likely to engage in one or more risky health behaviours compared to those who believed that they had no control over their own health or believed that the medical profession controlled their health (Bell, Quandt, Arcury, McDonald & Vitolins, 2002). As with the Angel *et al* study, individuals in this study's sense of control diminished with increasing age and with more health problems arising out of their engagement with risky health behaviours. It would seem therefore that a perceived sense of control over one's own age and ageing can play an important role in determining the extent to which an individual is able or willing to change outcomes in relation to their own health (Wurm, Tesch-Romer & Tomasik, 2007). Self-motivation can also play an intrinsic part in

reducing risky health behaviours of older adults and in motivating them to adopt a healthier lifestyle (Loeb, 2004). Whether motivation is intrinsic or extrinsic is important.

According to Loeb, an intrinsic motivation for better health was associated with greater participation in healthy behaviours. On the other hand, an extrinsic motivation, such as believing that one was too old to modify one's behaviour, was associated with using external factors as reasons for not engaging in healthy behaviours. With poor self-motivation, coping strategies may also decline, leading the individual to find external release mechanisms to help them cope with these losses (Brennan *et al.*, 2010). Individuals who engage in risky health behaviours to cope with life stressors, such as the ageing process, are less likely to change their behaviours but this is mediated by a number of health crises according to Brennan *et al* (2010).

Living a healthy lifestyle is not just about engaging in overt healthy behaviours, it also includes personal attributes like perceptions, beliefs, values, expectations as well as emotional and affective states (Gochman, 1997). Whilst only a tentative link was found between ageing and the health behaviours, the above findings have shown how age itself was found to be consistently correlated with individual willingness to control their level of engagement in risky health behaviours. In spite of this, there has been a dearth of research into the relationship between the ageing process itself and how individual beliefs about ageing are associated with these health behaviours. It is therefore important that we determine the nature of the relationship between how age is perceived and how it influences older adults' decisions to engage in more than one risky health behaviour.

2.4.2. Summary

Alcohol consumption among older adults brings a different set of problems for this age group compared to the problems faced by younger drinkers. Physiologically older adults have greater numbers of concomitant co-morbid illnesses, and are more likely to have an adverse interaction with frequently used medications and alcohol. This puts them at greater risk of injury in the event of a fall and increases their disease

burden leading to functional disability and poorer mortality rates. Similarly, older smokers also face different health problems compared with younger smokers. As cigarette smoking shows a dose–response relationship with all-cause mortality and morbidity with the rates of mortality and disease incidence significantly increased for the older smoker due to their increasing age and the duration of their smoking. Psychologically, harmful drinking and smoking has also been strongly correlated with poorer mental health and higher rates of psychological distress among the older age group. However, whilst harmful drinking and smoking are risk factors for long-term health problems, moderate alcohol consumption has been shown to reduce mortality and disease burden as well as improve psychosocial functioning in the older population.

This review has also shown that the barriers to change and the motivational forces behind change are numerous and there is no consensus on which ones are more important. Poor physical and psychological health has been shown to determine drinking patterns and smoking behaviour, though the direction of that relationship is unclear. In addition, there appears to be an inter-relationship between the health behaviours, whereby individuals who drink harmfully are more likely to smoke. Individual characteristics are also an important consideration but there is no clear evidence that they are the driving force behind the levels of alcohol consumed. The findings from the studies identified in this review established a strong link between the combined health behaviours and socio-demographic characteristics as well as health concerns. However, only a tentative link was found between ageing and the health behaviours but age itself was found to be consistently correlated with individual willingness to control one's level of engagement in risky health behaviours. Nonetheless an under-examined relationship has been that of the ageing process itself and how individual beliefs about ageing are associated with these behaviours.

During their later years, older adults are more likely to experience changes arising out of a variety of losses that include loss of physical and functional abilities, loss of roles, and loss of friends or family. All of these make older adults vulnerable for engaging in risky behaviours such as harmful drinking and smoking. However, the amount of

variability in the relationship between objective life conditions and subjective well-being raises questions regarding factors that account for such variability. A positive attitude to the ageing process has been identified as one mechanism for coping with radical life-altering situations over and above other correlates identified earlier. The next chapter will review empirical evidence regarding ageing self-perceptions and outline the role that they may play in shaping these health behaviours.

Chapter 3. Literature Review: Ageing self-perceptions

3.1. Ageing self-perceptions in context

3.1.1. Ageing stereotypes

Ageing stereotypes are the beliefs held by both individuals and society that are used to assign patterns of behaviours to a particular age cohort. In assigning such stereotypes to older adults, perceptions about ageing are developed that are associated with negative attitudes that emphasise isolation, loss of independence and physical and mental degeneration (Stewart, Chipperfield, Perry & Weiner, 2012). Recently, research has shifted away from those who target age stereotypes to those who are the recipients of them. Ageing self-perceptions refer to the ways in which middle-aged and older adults conceive their own ageing process and how this in turn effects how they experience their transition to old age (Demakakos, 2007). This review will apply the SRM, as described by Baker *et al* (2007), to show how this framework can be used in relation to ageing. It will also outline our current understanding of the relationship between ageing self-perceptions and health behaviours. From the perspective of self-regulation behavioural-self-regulation may be a behavioural response to one's experience of ageing along the dimensions.

3.1.2. Self-regulation in the ageing context

Within the social constructionist perspective no individual exists in a vacuum and the social aspects of our lives are seen as all pervasive (Wetherell & Maybin, 2002). The ways in which ageing is represented vis-à-vis society's beliefs and attitudes that are mediated through inter-personal sources such as the media, social interactions, and authoritative sources, as well as intra-personal sources such as the individual's own experience with the ageing process, may be reflected in the construction of the individual's own ageing representation or ageing self-perceptions. In this way, each individual's perceptions and experiences of the ageing process are formed through a dynamic interplay of the self and social norms that are reflected in the ways that

individuals internalised the social norms dictated by society (Levy, 2003, Westerhof & Barrett, 2005). There is empirical evidence that the ageing stereotypes presented to individuals in childhood are internalised by them to become ageing self-stereotypes, that will influence their conceptions of ageing and old age (Levy, 2003). Given the dominance of an ageist model in western societies that views old age from a negative framework, this issue is one of significant importance (Westerhof *et al.*, 2005).

The widely held assumption that ageing as a process is defined by the inevitable decline of the mind and body does not explain empirical findings that there is substantial variability both culturally and individually in older adults' health (Levy, 2009). It would not be surprising therefore, where prevailing negative age-based stereotypes exist, if the process of reaching middle and later years of life is not greeted with enthusiasm and if these cultural norms became incorporated into individuals' self-perceptions (Levy, 2009). Furthermore, this devaluation of age identities may be translated into policy, as the provisions that society makes for ageing transition will be centred on policies that define older people as hopeless and in need of care. As well as impacting on day-to-day behaviours such as choice of dress-style and leisure activities, older adults will reflect these age-based stereotypes as part of their identity centring on themselves in relation to others of the same age (Barrett, 2005).

However, whilst it is clear that older adults do experience more physical and psychological change in later life, empirical evidence suggests that older people are a diverse group that display wide variation in the ways that they cope with life challenges. Older adults are as likely to turn an infirmity into an opportunity for increased participation in health behaviours, as they are to allow it to have a negative impact on their lives (Garstka, Schmitt, Branscombe & Hummert, 2004).

3.1.3. Ageing self-perceptions and the ageing experience

The concept of ageing self-perceptions is not one that is widely used in public health. Yet as a concept it has a useful role to play, as studies of the effects of ageing self-perceptions show that they are of substantial importance as they are significant correlates of well-being (Steverink, Westerhof, Bode & Dittmann-Kohli, 2001,

Westerhof *et al.*, 2005) and health (Levy, 2003, Levy, 2005, Levy *et al.*, 2002a) as well as behavioural outcomes (Sarkisian, Prohaska, Wong, Hirsch & Mangione, 2005) and they play an important role in shaping ageing identity. A longitudinal study of ageing perceptions which evaluated rival hypotheses about the relationship between age stereotypes and self-view found that stereotyped expectations about elderly people predicted later self-appraisals and also influenced the age stereotypes held by individuals (Rothermund & Brandtstädter, 2003).

3.1.3.1. Emotional representation of ageing

Individuals who experience strong, negative, emotional responses to the ageing process such as fear, worry, depression, or anxiety, are more likely to experience illness and physiological breakdown (McKeen, Chipperfield & Campbell, 2004). Cross-sectional and longitudinal studies have shown how ageing self-perceptions negatively effect individual behaviour and long-term health (Levy & Myers, 2004, Levy *et al.*, 2002a, Wurm *et al.*, 2007). In a descriptive study, participants who reported feeling old also reported feelings of powerlessness, anxiety and fear in relation to their ageing (Nilsson, Sarvimaki & Ekman, 2000). The researchers also noted that those who reported feelings of powerlessness also reported a loss of independence and higher levels of dependence on others. Conversely, individuals who do not fear the ageing process, who have a positive age identity and strong social relationships, display a strong degree of motivation to change the impact of ageing on their lives (Smith & Freund, 2002). In the last decade, research has begun to link ageing self-perceptions with increased quality of life and better psychological well-being in the 50+ age group (Barker, O'Hanlon, McGee, Hickey & Conroy, 2007, Bowling, See-Tai, Ebrahim, Gabriel & Solanki, 2005, Hickey, O'Hanlon & McGee, 2010, Jang, 2007).

3.1.3.2. Timeline and ageing

The tendency that older adults have to postpone the age markers by identifying themselves with ages that are considerably younger than their own is consistent with the self-enhancement perspective which views the individual as someone who is motivated to sustain a positive conception of themselves (Kaufman & Elder, 2002). On

the other hand, negative beliefs regarding one's own age and labelling one's self as 'old' may impact on the way that individuals perceive their future and thus influence their attitudes and motivation for change (Kotter-Grühn & Smith, 2011).

In considering this cognitive dimension of ageing, i.e. how the individual perceives the temporal aspects of their own age and their ageing experience will determine their ability to accept or reject negative ageist stereotypes. Studies using a variety of age identity measures that assessed participants' own ageing identity both cross-sectionally and over time found that participants' age identities were significantly lower than their chronological age (Barrett, 2003, Demakakos, 2007, Hatta, 2010, Hubley, 2009, Kaufman *et al.*, 2002, O'Reilly, Thomlinson & Castrey, 2003, Uotinen, Rantanen, Suutama & Ruoppila, 2006, Uotinen, Suutama & Ruoppila, 2003). However, societies that promote youthful qualities over other qualities associated with ageing, are more likely to encourage concerns regarding physical appearance in its older population which in turn promote a fear of losses leading to a death anxiety (Benton, Christopher & Walter, 2007). Individuals who believe that they are reaching the end of their life might adopt an unhealthy lifestyle that in turn will create a self-fulfilling prophecy (Kuper & Marmot, 2003).

Longitudinal studies that examined whether having an older perceived age, independent of chronological age, was associated with all cause mortality found that describing oneself as older (both mental and physical age) than one's chronological age increased the risk of mortality even after adjusting for other covariates (Uotinen, Rantanen & Suutama, 2005). It also showed that physical age over mental age was the stronger predictor of mortality between the two perceived age variables. Qualitative research regarding age identity markers has identified the negative implications regarding ageing self-stereotyping (Nilsson *et al.*, 2000). In the Nilsson *et al* study, participants who reported feeling older than their chronological age were more preoccupied about getting older and appeared more despondent. They considered ageing as an irreversible process and had fewer positive expectations for the future with regard to their own ageing. On the other hand, participants who reported feeling

old only occasionally had a more positive outlook regarding their age and the experience of ageing.

3.1.3.3. Consequences and ageing

Older adults who have been subjected to negative depictions of the consequences of ageing may adopt and internalise these negative views and as a result might act with detrimental effects to their well-being and health (Levy, 2003). As ageing has been associated with physical and functional health difficulties, an individual's ageing self-perceptions will shape their expectations regarding their own ageing process that will in turn influence a variety of health outcomes (Levy *et al.*, 2002a). According to Levy *et al,* positive beliefs regarding age and ageing consequences have been associated with better functional health in an 18-year longitudinal study when compared with those who reported more negative beliefs. Another study investigated the directionality of the relationship between ageing expectations and physical functioning over a sixteen-year period (Sargent-Cox, Anstey & Luszcz, 2012b). The results showed that positive ageing beliefs predicted change in physical functioning over each year of the study even after controlling for age, gender, and a number of other factors.

An individual's perceptions of the future that include their willingness to make plans and to have an optimistic outlook are other factors that challenge adaptation (Kotter-Gruhn & Hess, 2012). Self-referent beliefs about how the individual perceives the impact of ageing on their life can also affect how they adapt (Kirkevold, Moyle, Wilkinson, Meyer & Hauge, 2012, Levy, Ashman & Slade, 2009, Steverink *et al.*, 2001). Individuals who are not psychologically resilient may have poor beliefs or expectations about how they might adapt to successfully manage their ageing experience.

Individual beliefs about the consequences of ageing also predicted physical recovery arising from serious health events, i.e. individuals who had positive views about ageing made a speedier recovery following myocardial infarction (Levy, Slade, May & Caracciolo, 2006). Another noteworthy finding is that ageing self-perceptions influence survival. Specifically, individuals with more positive ageing self-perceptions, measured up to 23 years earlier, lived longer than those with less positive ageing self-

perceptions (Levy *et al.*, 2002b). Research has also shown that ageing self-perceptions predict cause-specific mortality, i.e., individuals with more negative views about ageing were more likely to die from respiratory causes than those with more positive ageing self-perceptions (Levy, 2005). Negative expectations regarding ageing have also been strongly linked to psychological health, more specifically to higher levels of depression and health related quality of life (Sarkisian, 2002, Sarkisian *et al.*, 2005).

3.1.3.4. Control and ageing

Ageing self-perceptions also infer a level of control over ageing experiences that lead to an individual being more proactive in their attempts to influence self-referent health outcomes. Psychological characteristics such as perceived personal control (Angel *et al.*, 2009, Bell *et al.*, 2002), beliefs about individual self-competence (Bailis & Chipperfield, 2002) and having a disposition of accommodative flexibility (Rothermund *et al.*, 2003) have all been central to the levels of adaptability and psychological resilience shown by older individuals.

Cross-sectional and longitudinal studies of older adults have demonstrated how perceptions of control directly influence self-assessed health (Barrett, 2003), and functional health (Levy *et al.*, 2009). The Barrett study revealed how social inequalities shaped individual ageing experiences with those in the lowest social categories reporting more negative age identities and made more negative predictions about their future health compared with their wealthier counterparts. An additional longitudinal study carried out over five waves examined the utilisation of psychological resources, in the face of declining health, in maintaining positive ageing self-perceptions in older adults. The results demonstrated that maintaining self-esteem and an expectancy of personal control are important to buffer older adults ageing perceptions against the effects of declining physical functioning (Sargent-Cox, Anstey & Luszcz, 2012a). A further study assessed if and how ageing self-perceptions change with age and how these changes relate to distance from death (Kotter-Gruhn, 2009). The results showed that more favourable ageing perceptions are uniquely associated with lower mortality even after controlling for the effects of age, gender, socioeconomic status, diagnosis of dementia, or number of illnesses. With approaching

death, individuals become more negative about their ageing and report feeling older as their sense of control over their lives is diminished. Such findings are important as negative ageing self-perceptions may be amenable to change (Bardach, 2010). Whether the beliefs and expectations that individuals hold about their own ageing are positive or negative, will be reflected in their health outcomes (Sargent-Cox *et al.*, 2012a) and levels of engagement in health behaviours.

3.1.4. Ageing self-perceptions and health behaviours

Although research on the association between ageing self-perceptions and health behaviours is a relatively young discipline, studies have shown that ageing self-perceptions arising out of age stereotypes do influence the health behaviours in older adults. However, the research in this field has concentrated either on ageing self-perceptions in relation to physical activity alone or ageing self-perceptions in relation to a cluster of health behaviour, which usually includes the two behaviours of interest in this study. Nevertheless, the mechanisms of self-regulation that includes self-monitoring, having positive outcome expectancies and beliefs about self-efficacy are all important psychological factors for the promotion of engagement in positive health behaviours (Fleming, Lee, Martinez, Leblanc, McCollister, Bridges, Christ, Arheart & Pitman, 2007, Konopack, Marquez, Hu, Elavsky, McAuley & Kramer, 2008, Motl & McAuley, 2010, White, Wojcicki & McAuley, 2012).

Previous studies have demonstrated that older adults with positive ageing self-perceptions were more likely to practice preventive health behaviours over time (Levy *et al.*, 2004). These preventive health behaviours included exercise, drinking in moderation, avoiding fatty foods, and not smoking. Levy *et al* suggests two possible explanations as to why optimistic beliefs may be linked to better health behaviours. Firstly, that older adults with more optimistic beliefs are more adaptive when dealing with life stressors such as illness than pessimists. Secondly, that older adults with higher expectations of successful ageing may take better self-care. As a result optimistic individuals are better able to reduce psychological distress and are less likely to engage in risky behaviours, such as harmful drinking and heavy smoking (Mulkana &

Hailey, 2001). Conversely pessimistic individuals may have less motivation to engage in proactive health behaviours believing that health problems are inevitable in old age.

Other studies examining ageing self-perceptions in relation to two or more health behaviours have found that individuals with more positive ageing self-perceptions practice more preventive health behaviours over time. One study focused on the effects of ageing self-perceptions on the likelihood of engaging in preventative health behaviours over time. In this survey, older adults were asked about their attitudes towards their own aging and in addition they were asked how frequently they engaged in various preventative health behaviours such as limiting their alcohol consumption, use of tobacco and types of exercise undertaken in the past 20 years. After controlling for baseline measures, individuals with more positive self-perceptions of ageing engaged in more preventative health behaviours over the study period (Levy *et al.*, 2004). Another study assessed the relationship between ageing self-perceptions and the determinants of a healthy diet (Huy, Schneider & Thiel, 2010). The results of this study indicated that individuals with positive ageing self-perceptions had significantly better health behaviours than those who identified themselves as having negative ageing self-perceptions. Another study explored the effects of health-promoting behaviour on the relationship between ageing expectations and physical and mental health. A significant association was found, after adjusting for other factors, between higher expectations about one's own ageing and better physical and mental health (Kim, 2009).

Only one study assessing the relationship between ageing self-perceptions and alcohol consumption could be located for this review. This was a study that assessed the predictors of alcohol consumption among older Chinese adults in Canada (Lai, 2004). A measure of attitudes toward ageing was included as one of several other predictors. The finding that participants who held less positive attitudes to ageing consumed more alcohol than those with positive attitudes surprised the researchers. Reflecting on it, they surmised that within this group drinking was used as an escape mechanism from the challenges associated with growing older.

3.1.5. Summary

The above findings indicate the dearth of research into the topic of ageing self-perceptions in relation to health behaviours in older adults, either as independent behaviours or in relation to each other. However, it is clear that experiences and perceptions of ageing are of substantial importance for middle-aged and older people as they relate to health, and behavioural outcomes along with well-being, self and identity. The formation of each individual's perceptions and experiences of ageing is a dynamic process that pertains to self, social norms and their interplay and reflects the way an individual internalises social norms. Older adults who experience ageing in positive ways tend to have better health than older persons with more negative ageing experiences, and are therefore more likely to participate in social and health promotion and disease prevention activities and less likely to experience disability either physically or psychologically. It is also clear that ageing self-perceptions are multidimensional and that they involve beliefs regarding the ageing process particularly as they relate to physical, functional, psychological, and social health. Changing ageing self-perceptions may be an effective way of increasing participation in preventive health behaviours thereby improving the overall health outcomes of older adults.

Chapter 4. Research Aims and Objectives

4.1. Aims & theoretical basis

The key aim of this thesis is to determine the nature of the relationship between ageing self-perceptions and the two health behaviours of interest, alcohol consumption and smoking. In addition this study seeks to determine the prevalence of these two health risk behaviours among a community dwelling, older adult, Irish population.

A self-regulation model (SRM) in the context of ageing, developed by Barker *et al* (2007) was adopted as the study framework. Barker's SRM is based on Leventhal's Common Sense Model (CSM) and was adapted to describe different stressors involved in the ageing process. Barker applied Leventhal's basic constructs of consequences, timeline, control and emotional representation using an ageing concept and argued that this model would lend itself well towards an examination of the experience of ageing. Firstly, at a broad conceptual level, the model is potentially useful as it seeks to understand experience from the perspective of the individual and is consistent with an interpretive approach to ageing and the life cycle. The model also has a multi-dimensional feature which can enable us to gain more detailed insights into the complex and multifaceted nature of adults' perceptions of ageing.

Barker's SRM showed that there were three phases to self-regulation within the ageing context (as depicted in Figure 4.1). In the representation phase, an ageing representation might be guided by basic sources of information. Within the ageing context, health-related stimuli are likely to be important. How these stimuli are interpreted will likely govern the representation of ageing. Ultimately it is the interpretation of the different sources of information used by the individual that leads to the construction of the ageing representation. The second phase is self-regulatory behaviour in which the individual engages in strategies as a direct response to his/her cognitive representation of ageing and the emotional responses it elicits. The third and final phase of the model is outcome, which once again includes appraisal of coping

as well as other health-related outcomes. On the basis of these conceptual and practical features of Leventhal's CSM, Barker's dynamic SRM is both advantageous and applicable for use in an ageing context as it provides continuous feedback among representation, behavioural self-regulation, and appraisal.

The present study will approach preventive health behaviours in two ways that have not been previously examined. Firstly, using the SRM the study will measure older adults' beliefs about their own ageing. Secondly, the study will consider the extent to which these beliefs were associated with two health behaviours (alcohol consumption and smoking).

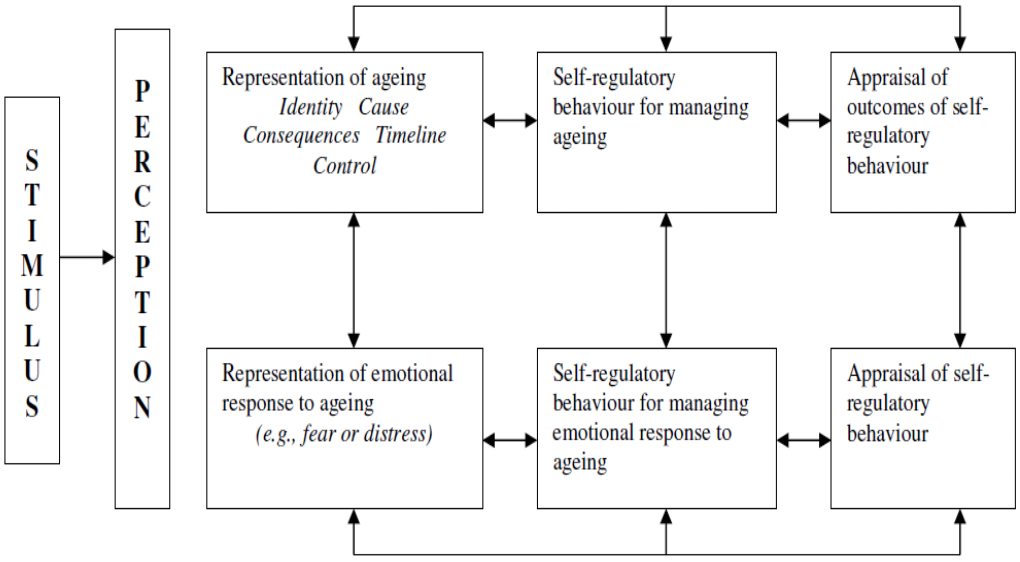


Figure 4-1: Self-regulation in an ageing context (adapted by Barker et al, 2007)

4.2. Research objectives and hypotheses

The primary study objectives and hypotheses which are outlined below will examine the cross-sectional relationship of ageing self-perceptions to alcohol consumption and smoking. Using the SRM described by Barker *et al,* this study expected that participants' alcohol consumption and smoking behaviour would be influenced by how they perceived different problematic aspects of ageing based on their levels of ageing self-perceptions. Pursuant to this, strong beliefs on either end of each of the domains

on the APQ which signifies the extent to which a participant endorses, or fails to endorse a specific domain on the APQ, will be associated with their level of engagement in each of the health behaviours.

Hypothesis 1

Timeline: An individual with a chronic ageing timeline may be constantly preoccupied with the experience of age or ageing compared with an individual with a less chronic or acute timeline. A chronic awareness means that they feel their age in everything they do and perceive constant reminders of their age and their ageing. Conversely, an individual with a strong cyclical ageing timeline may experience variation in their experience of age and ageing resulting in a lack of stability or continuity in their experience when compared with an individual who does not have a strong cyclical timeline. A cyclical awareness means that they perceive infrequent reminders that they are ageing and they only occasionally view themselves as old. The implications for an unstable cyclical timeline or a chronic ageing timeline are that the individual has difficulty setting goals or planning ahead. Therefore on the timeline domains, individuals with varying levels of cognitive dissonance regarding the temporal aspects of ageing will have a different relationship to health behaviours depending on the nature of the dissonance as outlined below.

a) Strong beliefs on the timeline domains will be related to alcohol consumption (one-tailed).
b) Strong beliefs on the timeline domains will be related to tobacco consumption (one-tailed).
c) When there is an inter-relationship between the two behaviours, the relationship between them and the timeline domains will be stronger. (one-tailed).

R*ationale:* The tendency that older adults have to postpone age markers by identifying both their ideal age and felt age as considerably younger than their chronological age is consistent with distancing oneself from the label “old”, thus rejecting ageing stereotypes. This is expected to facilitate more engagement in positive health behaviours such as moderating drinking levels and not smoking. Conversely, those who are unable to reject the ageist stereotype and are more chronically aware of their ageing, or have increased reminders of it, are expected to be less likely to engage in positive health behaviours.

Hypothesis 2

Consequences: An individual who perceives their own ageing as having high levels of positive consequences may have a positive outlook with regard to age and the ageing process. Their conception of ageing is a realistic one. They are aware that certain abilities will decline as they get older but have an appreciation for those qualities and abilities that remain intact. Conversely, an individual who perceives their own ageing as having high levels of negative ageing consequences may have a more negative outlook with regard to age and the ageing process. They associate ageing with a heightened risk of decline and can be consumed by fears regarding loss and independence and fear of dependency. Therefore the nature of the outlook that the individual holds regarding the ageing process may affect their willingness to engage in a healthy lifestyle which may be reflected in their alcohol and tobacco consumption as outlined below.

a) Strong beliefs on the consequences domains will be related to alcohol consumption (one-tailed).
b) Strong beliefs on the consequences domains will be related to tobacco consumption (one-tailed).
c) When there is an inter-relationship between the two behaviours, the relationship between them and the consequences domains will be stronger. (one-tailed).

Rationale: Cross-sectional and longitudinal studies have demonstrated that more positive expectations about the consequences of ageing are strongly associated with improved mood and enhanced quality of life among older men and women. It is expected that such improvements will lead to moderation in alcohol consumption and positive smoking outcomes, whereas individuals with more negative expectations about ageing consequences are expected to be more reluctant to engage in preventive health behaviours and thus engage in more risky health behaviours such has harmful drinking and smoking.

Hypothesis 3

Control: An individual who perceives themselves as agents in their own experiences relating to ageing may have a positive sense of control and as a result may be proactive in their attempts to influence outcomes in their own favour. They feel confident in their ability to control many aspects of their lives such as their social life,

strengthening important social relationships and striving to maintain their independence. Conversely, an individual who does not perceive themselves as agents in their own experiences relating to ageing may have a negative sense of control and as a result may be less proactive in their attempts to influence outcomes in their own favour. They perceive their ageing in terms of their functional decline with a significant loss of their independence. Therefore the level of control that an individual can exert in their own self-referent experiences may influence their drinking patterns and smoking behaviour as outlined below.

a) Strong beliefs on the control domains will be related to alcohol consumption (one-tailed).
b) Strong beliefs on the control domains will be related to tobacco consumption (one-tailed).
c) When there is an inter-relationship between the two behaviours, the relationship between them and the control domains will be stronger (one-tailed).

Rationale: Studies have demonstrated that the degree to which a person feels they have control over their own ageing experience will govern their level of engagement in health behaviours. Therefore individuals with a strong sense of personal control over both positive and negative aspects of ageing would be expected to engage in more positive health behaviours such as moderate drinking and/or not smoking to make their ageing experience a more positive one. Conversely individuals with a poor sense of control over these ageing experiences will be less likely to engage in positive health behaviours that might make their ageing experience a more positive one and thus engage in more harmful drinking and smoking.

Hypothesis 4

Emotional representation: In the context of ageing, an individual with strong negative emotional responses to the ageing process may also experience negative emotions such as worry, anxiety and depression leading to maladaptive coping skills. They feel unable to engage in a social life or have meaningful relationships with others and they feel angry and depressed about the thoughts of getting older. Conversely, those with strong positive responses to the ageing process may have better or more adaptive coping skills. Therefore the strength of emotional response to ageing may influence individual drinking patterns and smoking behaviour as outlined below.

a) Strong beliefs on the emotional representation domain will be related to alcohol consumption (one-tailed).
b) Strong beliefs on the emotional representation domain will be related to tobacco consumption (one-tailed).
c) When there is an inter-relationship between the two behaviours, the relationship between them and the emotional representation domain will be stronger (one-tailed).

Rationale: Research has shown that individuals who experience strong, negative, emotional responses to the ageing process are more likely to experience illness and psychological breakdown. Psychological distress has been strongly linked to harmful drinking and smoking, while individuals with positive emotional responses to the ageing process may display a strong degree of motivation to change the impact of ageing on their lives and are therefore more likely to engage in positive health behaviours such as limiting their alcohol consumption and not smoking.

Chapter 5. Methodology

5.1. Introduction

This chapter will outline the study methodology including the study design, recruitment and assessment tools and the data analysis plan.

5.2. Study Design

This project was a cross-sectional study of a community-dwelling population aged 50 years and over living in urban and rural areas in the Republic of Ireland. The design of the study was based on the sampling framework and design of some of the components of the first wave of TILDA (Kenny, Whelan, Cronin, Kamiya, Kearney, O'Regan & Ziegel, 2010).

5.3. Study participants

TILDA's study participants were selected using the RANSAM system, based on the Geodirectory that was developed by the Economic and Social Research Institute (ESRI) of Ireland (Appendix A). RANSAM grouped all of the residential addresses in Ireland into clusters and from these 640 clusters were identified and 40 addresses in each cluster were selected. Stratification was achieved by pre-sorting all clusters by socio-economic group and within socio-economic group using RANSAM's geographical "snake" pattern which orders clusters within county based on north/south patterns. Clusters were selected randomly with a probability selection proportional to the estimated number of persons aged over 50 in each cluster. In this way, each address had an equal probability of being selected from the 25,600 addresses gleaned from the 40 randomly selected addresses of each of the 640 clusters. All individuals over 50 years of age in the selected households including their partners, regardless of their age, were invited to participate in TILDA. Overall, a total of 8,175 interviews were conducted with participants who were aged 50 and over. In addition, 329 interviews were carried out with younger partners who were excluded from this current study.

The response rate target for the TILDA project was 60.2%. This was obtained from the number of successful interviews carried out at 25,600 addresses. Of these, 22,321 were classified as occupied residential addresses wherein 11,819 of these addresses the interviewer ascertained that no person over 50 lived there and in the case of 684 addresses the interviewer could not make contact or could not determine if a person over 50 lived there. The final number of eligible households was 9,818, exceeding the over 60% response rate target.

5.4. Procedure

TILDA collected a variety of health and social data across a variety of domains using the computer-aided personal interview (CAPI) questionnaire, a collection of self completion questionnaires (SCQ) and a health assessment. The CAPI questionnaire is an electronic questionnaire, organised by several modules, such as demographics, social circumstances, mental health and physical health. The SCQ includes a variety of questionnaires that assess many aspects of psychological well being such as respondent's experience of stress; anxiety; alcohol consumption and ageing perceptions. The Health Assessment was added to TILDA to compliment CAPI and the SCQ by adding a number of objective measures with regard to respondent's health status. The assessment includes baseline measures to assess risk for CVD and functional mobility. Following lengthy face-to-face interviews by trained interviewers, each participant was offered a full health assessment at designated health centres or a partial health assessment to be carried out in their own home where travel to a health centre was not practical. In addition participants were given the SCQ to complete and return. The completed Wave I data set is currently archived with the Irish Social Science Data Archive (http://www.ucd.ie/issda/data/tilda/).

5.5. Ethical approval

Ethical approval for this study was not necessary as the study used secondary data analyses of the TILDA data set. However, ethical approval for the TILDA project was sought and gained and a copy of the letter confirming this approval can be seen in Appendix B.

5.6. Inclusion and exclusion criteria

All persons in the selected households who agreed to participate in the TILDA study were considered. Participants who were under 50 years of age were excluded as were participants who did not return the SCQ or who did not complete the required number of items on the APQ.

5.7. Measures

Participants completed a series of measures for the TILDA study. However, only those measures that were relevant to this thesis are discussed here (Appendices D-G). These included two health behaviours (alcohol consumption and smoking) and a measure of ageing self-perceptions. In addition to these measures, other variables which were used as covariates in this study included socio-demographic measures (age, gender, education, marital status and social class), physical activity, self-rated health and depressive symptoms. Each of these variables will be discussed in further detail next.

5.7.1. Health Behaviours

5.7.1.1. Alcohol consumption

TILDA asked its participants several questions regarding alcohol consumption (Appendix D). Firstly participants were asked if they drink alcohol. This was followed by two statements of self-reported frequency (*During the last six months, how often have you drunk any alcoholic beverages, like beer, cider, wine, spirits or cocktails?*) and quantity (*During the last six months, on the days you drink, about how many units do you have?*). Binge drinking was determined by asking participants how often they had consumed more than the recommended daily limits (3 units for women and 4 for men) during the last six months. Current drinking patterns were then categorised into three groups based on each of these questions and using guidelines for safe drinking set down by the Department of Health (DOH) formerly the Department of Health and Children (DOHC, 2004). It should be noted that the DOH has recently lowered the safe limit guidelines (August, 2012). However, for the purpose of comparison with other European studies, the earlier DOHC guidelines will be reported here (Table 5.1). The

DOHC previously recommended a limit of 14 units[1] of alcohol per-week for women (now 11), with no more than 3 units on a drinking occasion. For men the previous recommendation was 21 units per week (now 17) with no more than 4 units on a drinking occasion. Furthermore, three regular alcohol-free days are recommended over the course of a week. Hence, three drinking categories were created for the purpose of this study and are outlined in Table 5.2: i) non-drinker; ii) moderate drinker (those who stayed within the recommended weekly or daily safe limits or who stayed within the suggested number of alcohol-free days); and iii) harmful drinker (those who consumed over the recommended daily or weekly limits or who consumed alcohol on more than four days per week).

Table 5.1: Department of Health and Children (2004) recommended drinking limits for men & women

	Drink limits per week	Drink limits per day	Drink free days
Men	21	4	3
Women	14	3	3

Table 5.2: Structure of drinking categories created for measuring drinking status

Non-drinker	Moderate drinker	Harmful drinker
Answered "No" to the question "Do you drink?"	Stayed within weekly drinking limits	Consumed over the recommended weekly limits
"No" means no alcohol consumed in previous six months	**OR** stayed within daily drinking limits	**OR** consumed over the recommended daily limits
TILDA's participants not asked about their former drinking history therefore not known if non-drinkers were previous alcohol users	**OR** took the recommended alcohol-free days	**OR** did not take the recommended alcohol-free days

[1] One unit of alcohol = One standard drink which contains 10g of pure alcohol/ethanol. Based on this calculation, a standard drink is equal to a half pint of beer or a single measure of spirits or a small glass of wine DOHC 2004. Strategic Task Force on Alcohol: Second Report. Dublin: Stationery Office: Department of Health and Children..

Rationale for measure of alcohol used

It should be noted that other ways of measuring alcohol consumption were considered prior to deciding on the measures outlined above. First of all, given the constraints of the measures collected by TILDA, it was not possible to establish a drinking history for this population. Therefore it is unknown whether non-drinkers are life-long abstainers or whether they are abstinent for other reasons, such as health.

Based on an extensive literature review a categorical variable was chosen as the most suitable measure for the purpose of this study. Initial attempts were made to use several categories that would best describe the harmful drinker. Based on this, a five category variable was established that took account of non-drinkers, moderate drinkers, constant drinkers (those who exceeded the weekly limits), binge drinkers (those who exceeded the daily limits or the recommended drink free days) and constant bingers (those who would exceed the daily and weekly limits). However, this variable produced a lot of cross-over with the same participants falling into two or more of the harmful drinking categories. In addition, it was noted that the proportion of individuals who were either constant drinkers or constant bingers was significantly lower than those who were binge drinkers. As a result, it was decided that these three categories would be collapsed into one category labelled 'harmful drinker' where cross-over was no longer an issue and none of the harmful drinkers were lost in the creation of this level.

It was also noted that TILDA used other measures to capture alcohol related problems in this study population. Participants were also asked; "Did you receive any treatment for your alcohol or substance abuse?" In addition, they completed the CAGE (cut-annoyed-guilty-eye) questionnaire, which is a valid screening assessment for alcoholism (Reid *et al.*, 2002). The CAGE is a scale with five possible values: 0, 1,2,3,4. The respondent scores one point for each "yes" response to the four items on the questionnaire. A score of two or more in the yes/no questions indicates harmful alcohol use or dependence.

This study considered using these measures in addition to the measure described above to elucidate the drinking problem issue. A total of 59 participants stated that

they had received treatment for alcohol or substance abuse (Table 5.3). Of note, 40 of these are in the non-drinking category. There was also considerable cross-over between participants with a positive score for drinking problems on the CAGE and those in the harmful drinking category (51%) (Table 5.4). These findings suggest some limitations to self-reported measures which capture a snap-shot of time of an individual's behaviour. The findings also highlight some limitations in the measures used by TILDA. A previous drinking history might have been useful to shed some light on individual reasons for not drinking or for drinking moderately. These limitations will be discussed in further detail later.

Nonetheless, in spite of these limitations, self-report quantity, frequency, and questions about harmful drinking have been shown to have moderate to good validity, and excellent reliability in an older adult population (Satre *et al.*, 2007). TILDA's measures go further than most quantity-frequency measures as they enable assessment of sporadic harmful drinking by asking participants about the frequency of drinking more than the recommended units in a day. Given that this current study assessed drinking patterns rather than drinking history, the measure that was used in this study and is outlined above, suited the purpose for which it was designed.

5.3: Numbers in receipt of treatment for alcohol or substance abuse (n = 6576)

	Did you receive any treatment for your alcohol or substance abuse?			
Alcohol Use	**N/A**	**Yes**	**No**	**Total**
Non-drinker	1597	40	12	1649
Moderate drinker	3442	12	7	3461
Harmful drinker	1455	7	4	1466
Total	6494	59	23	6576

Note: N/A = Not Applicable

5.4: Numbers with a positive CAGE score of ≥ 2 indicating harmful alcohol use or dependence (n= 6576)

	Cage Score		
Alcohol Use	**Negative**	**Positive**	**Total**
Non-drinker	1648	1	1649
%	29.04	0.11	25.08
Moderate drinker	2016	445	2461
%	53.15	49.29	52/62
Harmful drinker	1011	455	1466
%	17.01	50.50	22.29
Total	**6494**	**59**	**6576**
%	**100**	**100**	**100**

The measures on smoking that TILDA developed aimed to establish individual lifelong smoking history (Appendix E). TILDA assessed cigarette smoking status and history as well as current use of other tobacco products (cigars/cigarillos or pipes). Smoking status was ascertained through several survey items. Respondents were first asked, *"Have you ever smoked cigarettes, cigars, cigarillos or a pipe daily for a period of at least one year?"* Those who answered "no" to this question were categorised as never smokers. Those who answered "yes" to this question were then asked *"Do you smoke at the present time?"* Participants who gave an affirmative answer to this question were classified as current smokers while the other participants were classified as former smokers. Participants who identified themselves as former smokers were then asked about their previous smoking *history "How old were you when you stopped smoking?"* or *"For how many years did you smoke altogether?"* Current and former use of other forms of tobacco was assessed by asking participants, "*What do/did you smoke (before you stopped*)?" Participants who identified themselves as current cigarette smokers were asked how long they had been smoking for and about the average number of cigarettes they usually smoke per day.

The validity of self-report as a measure of smoking behaviour

While the purpose of this study was to assess the smoking behaviour of older adults, the study did consider also assessing smoking history and levels of exposure in this older population. However, this was not possible because of the high proportion of participants (61%) who did not answer the question *"How old were you when you stopped smoking?"* Therefore, this study used a measure of smoking behaviour widely

used in medical and substance use literature (Giskes, Kunst, Benach, Borrell, Costa, Dahl, Dalstra, Federico, Helmert, Judge, Lahelma, Moussa, Ostergren, Platt, Prattala, Rasmussen & Mackenbach, 2005, King *et al.*, 2006, Leung *et al.*, 2011, Rutten, Augustson, Moser, Beckjord & Hesse, 2008, Yu *et al.*, 2002, Yun, Kang, Lim, Oh & Son, 2010, Zheng *et al.*, 2008) to compare outcomes in current and past users with those never smokers based on the self-reported smoking status outlined above. By combining responses to the smoking history items discussed earlier, Table 5.5 demonstrates how current smokers were defined as someone who reported smoking consistently for one year and who smoked at the time the survey was carried out. Former smokers were defined as individuals who reported smoking consistently for a one year period and who did not smoke at the time of the survey. The remaining participants were defined as never smokers.

Table 5.5: Structure of categories created for measuring smoking status (n = 6576)

Never-smoker	Former-smoker	Current-smoker
Answered "No" to the question *"Have you ever smoked cigarettes, cigars, cigarillos or a pipe daily for a period of at least one year?"*	Has smoked consistently over at least one single year period	Has smoked consistently over at least one single year period
"No" means no tobacco was consumed over a 365 day period.	Was a "never" smoker at the time of the survey	Smoked at the time of the survey
	No previous quitting attempts ascertained	No previous quitting attempts ascertained

5.7.2. Ageing self-perceptions

5.7.2.1. The Ageing perceptions questionnaire

The APQ (Appendix G) was included as the instrument of choice to measure ageing self-perceptions in TILDA based on a finding that any measure used to assess older people's ageing perceptions should have good psychometric properties, be theoretically derived and capture the multifaceted nature of the ageing process (Barker *et al.*, 2007). In developing this self-report 32-item questionnaire, which is based on Leventhal's self-regulation framework, Barker and colleagues established a

novel instrument to assess ageing perceptions, demonstrating subscale reliability with Cronbach's alpha coefficients for each of the domains above 0.7 and showing that ageing perceptions were independently associated with physical and psychological health indices (Barker *et al.*, 2007). The APQ assesses self-perceptions of ageing in seven distinct domains and is constructed using a 5-point Likert scale ranging from strongly disagree to strongly agree (see Table 5.6). The mean score which is calculated for each subscale is divided by the number of questions on that subscale to yield a score of 1-5 for each of the domains with higher scores being indicative of greater endorsement of a specific perception. No summary score is obtained.

Table 5.6: Breakdown and description of domains and scoring on the APQ (n = 6576)

Domains (and number of questions)	**Domain Description**	**Likert Scale Scoring** (higher scores indicate greater endorsement)
Timeline-chronic (5)	Beliefs about awareness of ageing and variation in experience of the process over time.	1 – 5
Timeline-cyclical (5)		1 – 5
Consequences-negative (5)	Beliefs about the positive and negative impacts of ageing on one's life.	1 – 5
Consequences-positive (3)		1 – 5
Control-negative (4)	Beliefs about one's power over both the positive and negative aspects of ageing.	5 – 1 (reverse-scored)
Control-positive (5)		1 – 5
Emotional-representation (5)	Beliefs about one's emotional responses to ageing	1 – 5

5.7.3. Socio-demographic indices

Gender, age, marital status, level of education and social class were recorded as the key socio-demographic variables to be used as covariates in the study of the two health behaviours.

a) Age was measured in years and also coded into three categories for descriptive purposes: 50-64 years; 65-74 years and 75 years and over.

b) Marital status was coded into four categories: "married", "never married", "separated/divorced", and "widowed".

c) Level of education was operationalised as the highest level of education completed by participants in formal educational settings. Response options were on a scale of 1 (primary education or less), 2 (some second level, no exams), 3 (passed Group, Intermediate or Junior Certificates), 4 (passed Leaving/Matriculation), 5 (diploma or equivalent from university/RTC/IT), 6 (Primary/Bachelors Degree or equivalent), and 7 (higher degree). For descriptive purposes participants were coded into three educational categories: primary (participants with responses of 1), secondary (participants with responses of 2, 3, or 4), and tertiary (participants with responses of 5, 6, or 7).

d) Social Class (SC) was determined by reported occupation of those who were currently employed or retired. TILDA used the Economic and Social Research Institute (ESRI) social class classification structure to categorise its participants. The ESRI classification uses seven categories.

    1. professional workers (social class 1);
    2. managerial and technical (social class 2);
    3. non-manual (social class 3);
    4. skilled manual (social class 4);
    5. semi-skilled (social class 5);
    6. unskilled (social class 6).
    7. farmers.

For descriptive purposes, these seven categories were coded into four social classes: SC 1-2, SC 3-4, SC 5-6 and farmers. In cases of participants who were currently unemployed, who were out of work through long-term illness, who worked in the home as a carer of a family member, or where there was not enough information available to assign a social class classification, he or she was assigned to an 'unclassified' group (Barrett, Savva, Timonen & Kenny, 2011).

5.7.4. Other covariates

Physical activity was assessed in TILDA using the International Physical Activity Questionnaire (IPAQ) short form (Craig, Marshall, Sjostrom, Bauman, Booth,

Ainsworth, Pratt, Ekelund, Yngve, Sallis & Oja, 2003) (Appendix F). This standardised measure which estimates habitual practice of physical activity consists of eight items estimating the time spent performing physical activities (from walking to moderate and vigorous exercise) and inactivity (time spent sitting) was used. For the purpose of this analysis, respondents were classified as undertaking; low (little or no physical activity, less than 5,000 steps a day), moderate (approximately 5,000 - 10,000 steps a day) or high levels of physical activity (over 10,000 steps a day). Smoking and alcohol use, which are outlined in detail above, were included as separate covariates of each other. These three health behaviour measures were included as covariates based on findings that risky health behaviours have an inter-relationship whereby people tend to engage in more than one at-risk behaviour at any one time (French *et al.*, 2008). For example, harmful drinkers are more likely to be smokers (Hajat *et al.*, 2004); current smokers are more likely to exceed the alcohol consumption levels of never smokers and former smokers (Burger *et al.*, 2003, Sacco *et al.*, 2009) and to consume alcohol more frequently (Hirayama, Lee, Binns, Okumura & Yamamoto, 2009); men who take moderate levels of physical activity are more likely than women to consume alcohol (Lisha, Martens & Leventhal, 2011); and physically active women and men have a higher daily alcohol intake than sedentary participants (Burger *et al.*, 2003).

Self-rated health was also included as a covariate based on empirical evidence that a person's appraisal of their own general health has been found to be strongly associated with health behaviours (Conry *et al.*, 2011, Satre *et al.*, 2007). Overall self-rated health was measured using five response options coded as: 1) excellent; 2) very good; 3) good; 4) fair; or 5) poor.

The final covariate was the presence of depressive or anxiety symptoms. This was included based on empirical evidence demonstrating a complex interaction between emotions such as depression and anxiety with healthy and unhealthy behaviours (Anton *et al.*, 2005). TILDA included the Hospital Anxiety Depression Scale – Anxiety subscale (HADS-A) as a useful screening tool for anxiety and depression in a non-psychiatric clinical population (Kenny *et al.*, 2010). The scale consists of 14 items (7 for anxiety and 7 for depression). Each item is rated on a four point scale ranging from

0 (not at all) to 3 (very often). Responses are based on the relative frequency of symptoms over the preceding week. Possible scores range from 0 to 21 for each subscale. An analysis of scores on the two subscales supported the differentiation of each mood state into four ranges: 'none/mild cases' (scores 8-10), 'moderate cases' (scores 11-15), and 'severe cases' (scores 16 or higher).

5.8. Data analyses

5.8.1. Data screening

Data was analysed using two statistical packages for Windows Stata 12 and PASW Statistics 18. Prior to analysis, all variables were examined for accuracy of data entry, missing values, normality of distribution, the presence of outliers, multicollinearity, singularity and homoscedasticity (Tabachnick & Fidell, 2007). In addition, the self-reported measures used to examine the health behaviours in TILDA were compared with the measures used in the SLÁN 2007 survey in order to determine the level of concordance in the data regarding the behaviours.

5.8.2. Statistical analyses

Univariate analyses were used to calculate baseline demographics for the study sample and ageing self-perception. Demographic variables were compared using chi-square analyses and analyses of variance (ANOVA), as appropriate. In all cases where ANOVAS were implemented, simultaneous post hoc tests based upon the studentized range distribution in conjunction with a pair-wise test (the Scheffé test) of comparisons were carried out.

To examine the study hypotheses that strong beliefs on each of the APQ domains would be related to drinking and smoking behaviours, multinomial logit models (MNLM) were fitted using each of the seven domains on the APQ as the main independent variables and drinking category as one dependent variable with non-drinkers being the omitted group and smoking status as the other dependent variable with never smoker the omitted group. Covariates included age, gender, education, marital status, self-rated health, depression, smoking status (or drinking status) and

physical activity. The regression parameter estimates for all variables were estimated relative risk ratios (RRR). No weights were used in this analyses based on the rationale that study was concerned with individual rather than population beliefs about ageing. The study hypotheses that the relationship between APQ domains and drinking and smoking would be stronger when there was an inter-relationship between the two health behaviours, was tested using multivariate analyses of covariance (MANCOVA). All tests were one-tailed and a critical alpha level of 0.05 was used.

5.8.2.1. Rationale for choosing MNLM

There were several factors to take into consideration before choosing MNLM as the form of regression to be used to examine the study hypotheses. The two outcome variables in this study were alcohol consumption and smoking. The justification regarding the structure of these two variables has been discussed in detail above. Once a decision was made regarding the variable structures it became clear that polytomous logistic regression models would be required in this study as the two outcome variables were multi-category response variables (Long & Freese, 2005).

According to Long & Freese, the next decision to make when analysing a polytomous response is to determine whether the response variable is *ordinal*, (whereby the categories are ordered), or *nominal*, (whereby the categories are unordered). This is important for the choice of regression model to be used as some models are only appropriate for ordinal responses while other models can be used whether the responses is ordinal or nominal (Long *et al.*, 2005). According to Long & Freese, whilst the order of an ordinal response does not have to be taken into account, neglecting it might cause the model to be overly complicated and less parsimonious, making it more difficult to identify potential relationships with other variables.

On the other hand, it is also important to consider the nature of the potential predictors when the response variable is polytomous. In the case where the predictors are discrete as well, a loglinear model might be fitted. However, Long & Freese caution against the use of this model due to its complicated output which describes the joint distribution of all the variables, unlike the output from logistic models which describe the conditional distribution of the response given the predictors. In this way,

Long & Freese argue that a loglinear model is difficult to interpret and recommend using a logistic model when analysing categorical variables where one is outcome variable and the others are predictors.

Another option was to split the response variables into a sequence of binary choices and model them using ordinary logistic models. While this approach might be helpful if outcome categories were a natural sequence (ordinal) of binary choices, in this study this was not the case as there was not a natural sequence (nominal) to drinking status and the sequence for smoking status was also questionable.

In summary, the MNLM is the most appropriate model to fit for the purpose of this study for two reasons. Firstly, drinking status does not have a natural sequence as moderate alcohol consumption (category 2) has been associated with several positive physical and psychosocial outcomes for the consumer over and above those outcomes associated with being a non-drinker. In addition, not enough is known about how or if moderate drinking is shaped by the ways in which individuals perceive their own ageing. Secondly, with regard to smoking status, because not enough is known about how or if smoking status is shaped by ageing self-perceptions and whether or not former smokers (category 2) have more positive beliefs about their own ageing than never smokers or vice versa, the ordinality of the smoking status is questionable. In this case Long & Freese recommend that when there are concerns regarding the ordinality of the outcome variable, an MNLM is the most appropriate model to fit.

Chapter 6. Results

6.1. Introduction

This chapter outlines the results of the study. Firstly, it describes how the final data set from the first wave of TILDA was screened prior to analyses. Characteristics of the study population are outlined and the relationships between the health behaviours and socio-demographic factors are explored as well as their relationship to individual beliefs about ageing. Finally, this chapter examines the hypotheses outlined in Chapter 3.

6.2. Data screening

6.2.1. Data accuracy

Minimum and maximum values, means and standard deviations for all variables were inspected for plausibility. Some variables were identified with extreme values coded as responses. An example of this was the first question on the APQ that should have a minimum value of one and a maximum value of five. However in the case of one observation, a maximum response value of 99 was coded. As there was no access to the original data, this response was re-coded as missing. All other values were found to be satisfactory.

6.2.2. Missing data

Missing value analyses was performed to examine each variable. With the exception of ageing perceptions, variables were missing only a few (5% or less) data points (see Appendix C: Table A1). In accordance with Tabachnick & Fidell (2007), where the number of missing data is low, a system list-wise deletion was adopted for relevant analyses. The range of missing items in the views about ageing on the APQ was high. Of the 8,504 TILDA participants, 85% returned their SCQ which included the APQ. However, the completion rates for the APQ section were lower overall, with just 68% of participants completing every item on the APQ. A dummy variable for ageing

perceptions with two levels (APQ items not missing and APQ items missing) was created. According to Tabachnick & Fidell when the pattern of missing data is predicted by other fully recorded variables in the dataset the data is said to be missing at random (MAR). However, when the probability of a missing value depends on the variable that is missing, the data is missing not at random (MNAR). For example, in this study, if individuals with a chronic awareness of their own ageing were less likely to record a score on the timeline acute/chronic scale, clearly the mean timeline acute/chronic score for the available data may not be an unbiased estimate of the mean that would have been obtained with a complete data set. The preferred outcome, according to Tabachnick & Fidell, is for the data to be MAR.

Therefore chi-square tests of the relationship between the mean differences of the fully recorded variables on a variety of demographic variables and the APQ items that were present or missing were carried out to ascertain if the items were MAR. The demographic variables included were age, gender, education, social class and marital status. A dichotomised APQ missing/not-missing variable was created as the dependent variable for this analysis. Initial results outlined in Table 6.1 below suggested that the data was MAR as the missing items was explained by gender χ^2 (1, N = 8,163) = 25.24, p < .001; by age χ^2 (1, N = 8,163) = 123.74, p < .001; by education χ^2 (1, N = 8,163) = 289.25, p < .001); by social class χ^2 (1, N = 8,163) = 133.14, p < .001) and by marital status χ^2 (1, N = 8,163) = 118.91, p < .001). In the overall sample, more women (58%) than men failed to complete all of the items on the APQ. Similarly, more items were missing for those in the oldest age category, 75 years and over (23%) and those with the lowest level of education (43%). Additionally, those in the lowest social class categories, SC5-SC6 (16%) and those who were unclassified had more missing items (43%) as did those who were single by virtue of never being married (11%) being separated/divorced (8%) or being widowed (20%).

In addition, t-tests of variance between the present and missing APQ items by the two dependent variables, alcohol use and smoking, were also carried out. The independent t-tests revealed that there was a significant relationship between the missing data and alcohol use (t(6490) = 5.28, p < .001) as well as the missing data and

smoking (t(8160) = -4.53, p < .001). Those who completed the APQ items consumed more alcohol (2.6 units) than those who did not complete it (2.1 units) and were more likely to be current smokers (19%).

Table 6.1: Comparison of APQ item present and missing by demographic variables (n = 8163)

Variable	APQ items not missing	APQ items missing	P-value
Gender (%)			< .001
Male	47.7	41.8	
Female	52.3	58.2	
Age (%)			< .001
50-64	60.2	50.6	
65-74	26.4	26.7	
75 & over	13.4	22.8	
Education (%)			< .001
Primary	25.1	42.5	
Secondary	58.1	49.1	
Tertiary	16.8	8.4	
Social class (%)			< .001
SC1 - SC2	25.1	15.6	
SC3 - SC4	21.5	18.6	
SC5 - SC6	11.3	15.9	
Farmer	5.9	7.4	
Unclassified	36.2	42.5	
Marital status (%)			< .001
Married	72.6	61.4	
Never married	9.0	11.2	
Sep/divorced	6.4	7.5	
Widowed	12.0	19.9	

Note: APQ = ageing perception questionnaire

Finally, a series of one-way ANOVA tests were carried out to assess the mean differences between the present and missing APQ items and each of the seven domains on the APQ were carried out to determine if the data was MNAR (Table 6.2). The analyses revealed that there was a significant relationship between the missing data and each of the seven domains of the APQ confirming that the missing data was MNAR. Whilst those who did not complete all of the APQ items consumed more alcohol and were more likely to be smokers, they were also more chronically aware of their ageing and perceived increasing reminders of it. They were less positive about the positive consequences associated with their ageing and were more negative about the negative consequences. They reported feeling less control over both the positive

and negative aspects of ageing. Finally, they had a more intense negative emotional response to ageing compared to those who completed all of the APQ items.

Table 6.2: Comparison of APQ item present and missing by APQ domains (n = 6576)

APQ domains	APQ items not missing	APQ items missing	P-value
Timeline acute/chronic	2.6	2.7	0.0048
Timeline cyclical	2.7	2.8	< .001
Consequences positive	3.8	3.7	0.0026
Consequences negative	2.8	3.0	< .001
Control positive	4.0	3.9	< .001
Control negative	2.8	3.1	< .001
Emotional representation	2.3	2.4	< .001

Note: APQ = ageing perception questionnaire

Rationale for imputation

Several options were considered in reaching a decision of how to handle the missing APQ data based on the Cochrane principles for dealing with missing data that are MNAR (Higgins, Deeks J.J. & D.G., 2008):

1. To analyse only the available data thus ignoring the missing data. However as the missing values were scattered throughout cases and variables, deletion could mean a substantial loss of participants and could lead to biased results.
2. To impute the missing data with replacement values such as imputing with an assumed outcome, imputing using the mean, or imputing based on predicted values from a regression analysis. An advantage to this method is that it is more objective than simply guessing the mean. However, in using this method the imputed data is more likely to be overly consistent with the variables that were used to predict them than a real score would have been, thus resulting in reduced variance as a result of the estimate being too close to the mean.
3. To impute the missing data, using multiple imputation or simple imputation methods adjusting for the standard error. This method retains sample variability and does not make assumptions about whether the data is MAR or MNAR.
4. To use statistical models that allow for missing data, making assumptions about their relationships with the available data. This method has the same

advantages as item 3 above and in addition it allows for various types of data to be imputed at once using a combination of univariate techniques.

The Cochrane group recommend options 3 or 4 but with a cautionary note with regard to the complexities involved in using these methods. In order to preserve the APQ variables, which were a key component of this study, missing data was imputed using STATA 12.1 with multivariate imputation using chained equations (MI impute chained) with predictive mean matching. This method has features of items 3 and 4 using a multiple imputation method that also makes assumptions about the missing data's relationship to other variables.

Before imputation was commenced, a missing data protocol was adhered to when tabulating the APQ sub-scale scores in accordance with the protocol adopted by Barker et al (2007). Specifically, where the sub-scale had five or four items, a maximum of two items could be missing and one in the case of a sub-scale with three items. As ageing perceptions are the principal independent variables, observations were dropped where the number of missing items exceeded the limits set down by the protocol. Finally, the seven domains of the APQ were imputed using chained multivariate imputation with predictive mean matching resulting in an overall sample size of 6,576 representing an 81% response rate. According to Tabachnick & Fidell (2007), imputation may reduce variability, artificially increase R^2 and reduce standard errors. They recommend that analyses be carried out with and without the missing data. This recommendation was implemented in this study.

6.2.3. Variable distribution

Normal variable distribution was explored with formal inference test and with graphical analyses once the protocol for missing data on the APQ had been followed but prior to imputation. Skewness and Kurtosis was calculated for the main dependent and outcome variables (Table 6.3) to determine the extent to which they violated the assumptions of normality. The critical value of a z score of ± 3.29 was used to estimate normality, recommended by Tabachnick & Fidell (2007). Departure from normality

was evident in all but one of the seven domains on the APQ subscales, control-negative where skewness (0.26) and kurtosis (-0.33) scores were well within expected

Table 6.3: Skewness and Kurtosis sores for main dependent and outcome variables (n = 6576)

Scale	Subscale	Scale Range	Skewness		Kurtosis	
			Statistic (SE)	Skewnesss (z)	Statistic (SE)	Kurtosis(z)
APQ	Timeline-acute/chronic	1-5	0.08 (0.03)	2.66	-0.45 (0.06)	-7.50
	Timeline-cyclical	1-5	0.14 (0.03)	4.66	-.49 (0.06)	-8.17
	Consequences-positive	1-5	-0.92 (0.03)	-30.66	2.29 (0.06)	38.16
	Consequences-negative	1-5	0.008 (0.03)	0.26	-0.38 (0.06)	- .33
	Control-positive	1-5	-1.02 (0.03)	- 34.00	3.92 (0.06)	65.33
	Control-negative	1-5	-0.23 (0.03)	7.66	-0.32 (0.06)	-5.33
	Emotional-representation	1-5	0.59 (0.03)	1.96	0.32 (0.06)	5.33
Smoking	Current/Former/Never	1-3	0.48 (0.03)	16.00	-1.02 (0.06)	-17.00
Alcohol	Quantity of units per day	0-40	1.15 (0.03)	38.33	1.39 (0.06)	23.16
	Frequency of drinking alcohol	0-6.5	-.21 (0.03)	-7.00	-1.23 (0.06)	-20.50

Note: APQ = ageing perception questionnaire
SE = standard error

values. Although timeline-acute, timeline-cyclical, control-negative and emotional-representation were not normally distributed, the levels of skewness or kurtosis was not strong. Departure from symmetry was most evident in the consequences-positive and the control-positive domains with respective skewness (-30.66, - 34.00) and kurtosis (38.16, 65.33) scores well beyond ± 3.29. These two variables were examined for the most suitable transformation to normalise these levels using gladder in STATA 12.1 and no suitable transformation was identified (Figures 6.1 & 6.2). However, Tabachnick & Fidell (2007) argue that an abnormal distribution is more likely to occur in large sample sizes and the assumptions of normality are dependent on the statistical procedure used, recommending the use of both parametric and non-parametric procedures. In this study, both parametric and non-parametric procedures were used.

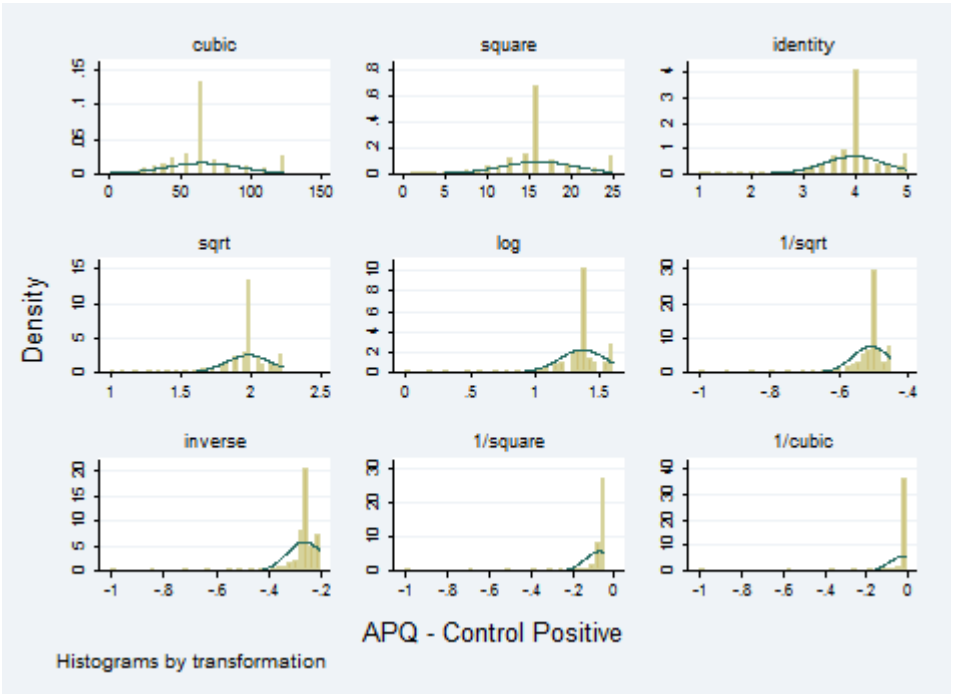


Figure 6-1: Transformation options for Control Positive

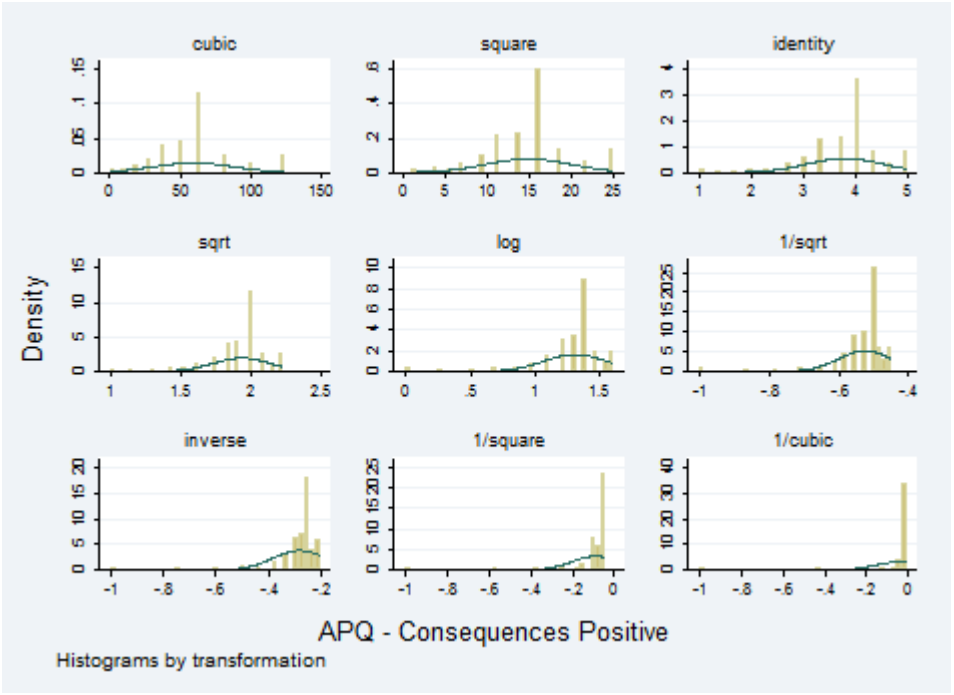


Figure 6-2: Transformation options for Consequences Positive

6.2.4. Detecting univariate outliers

Outliers are cases that have data values that are very different from the data values for the majority of cases in the data set. They are important because they can change the results of data analysis (Kirwood & Sterne, 2003). Tabachnick & Fidell (2007) argue that standardised z scores in excess of ± 3.29 are potential outliers. This criterion was used to detect the presence of univariate outliers on the APQ subscales and main outcome variables. Twenty-three outliers were present on the emotional representation scale. Analyses were conducted with and without these outliers. Their presence had no effect on findings. Therefore, findings are reported with the outliers present.

6.2.5. Detecting multivariate outliers

The observations on the seven domains were screened for multivariate outliers through regression in PASW 18. Mahalanobis distance at p <.001 was the criterion used for multivariate outliers (Tabachnick *et al.*, 2007). These are distributed on a chi-squared distribution with the degrees of freedom equalling the number of predictor variables used (in this case seven). Therefore cases with Mahal Distance greater than

$\chi 2(7) = 56.64$ were identified as multivariate outliers. In this data set one such outlier was identified. Analyses were carried out with and without this outlier present with no effect on the findings.

6.2.6. Multicollinearity, singularity and homoscedasticity

Where regression analyses were proposed, assumptions regarding statistical inferences about population relationships were challenged by examining multicollinearity and singularity, which were assessed using a variance inflation factor (VIF). In addition, homoscedasticity was assessed with rvplots and the Cook and Weisberg test for homoscedasticity (Pevalin & Robson, 2009).

6.2.7. Level of concordance between TILDA & SLÁN 2007 health behaviour data

The self-reported measures used to examine the health behaviours in TILDA were compared with the measures used in the SLÁN 2007 survey in order to determine the level of concordance in the data regarding the behaviours. Prevalence measures of health behaviours are difficult to compare across settings because of the lack of a gold standard. Given that very little research has been carried out to assess the measures used to reconstruct salient lifetime health behaviours, the purpose of this comparison was to ascertain the levels of agreement regarding the prevalence of alcohol consumption and tobacco use found between two large population surveys, both conducted in Ireland.

6.2.7.1. Comparison of drinking patterns between the TILDA and SLÁN population

The rates of abstinence in the SLÁN population were 21% among 45-64 age group and 41% among the 65+ age group. In the TILDA population the rates of abstinence were somewhat lower for both the 50-64 (17%) and the 65+ age groups (36%). Table 6.4 and Figure 6.3 show the frequency distribution of drinking among the 6576 TILDA responders by gender. In the SLÁN survey 45% of men reported that they drank more frequently, 2-3 times a week compared with 29% of women. In TILDA the most common frequency of drinking reported by both men and women was 1-2 times per week with more men than women in this category (33% vs. 26%). In SLÁN 2007, 11%

of men aged 45-64 exceeded recommended safe limits of 21 units per week compared with 5% of men aged 65 and over. Among women, 4% of those aged 45-64 exceeded recommended safe limits of 14 units per week compared with just 1% of women aged 65 and over. In TILDA, these proportions were equivalent, with 10% of men in the 50-64 age category exceeding the recommended weekly limits and 4% in the 65+ age category. Among women the numbers exceeding the recommended weekly limits were the same as SLÁN with 4% in the 50-64 age categories and 1% in the 65+ age category.

Table 6.4: Differences in drinking patterns of men & women (n = 6576)

	Men (n= 3006)	Women (n=3570)	p value[a]
Drinking frequency (%)			<.001
Never	20.6	29.4	
almost every day	9.0	4.5	
five or six days a week	5.0	2.7	
three or four days a week	14.5	10.0	
once or twice a week	32.7	26.0	
once or twice a month	10.0	14.2	
monthly or less	8.2	13.2	
Quantity of units, mean (SD)	3.86 (2.88)	2.47 (2.14)	<.001

Note: Means (standard deviation) are shown for continuous variables and percentages for categorical variables.

a. Derived from one-way t-test for continuous variables and $\chi 2$ test for categorical variables

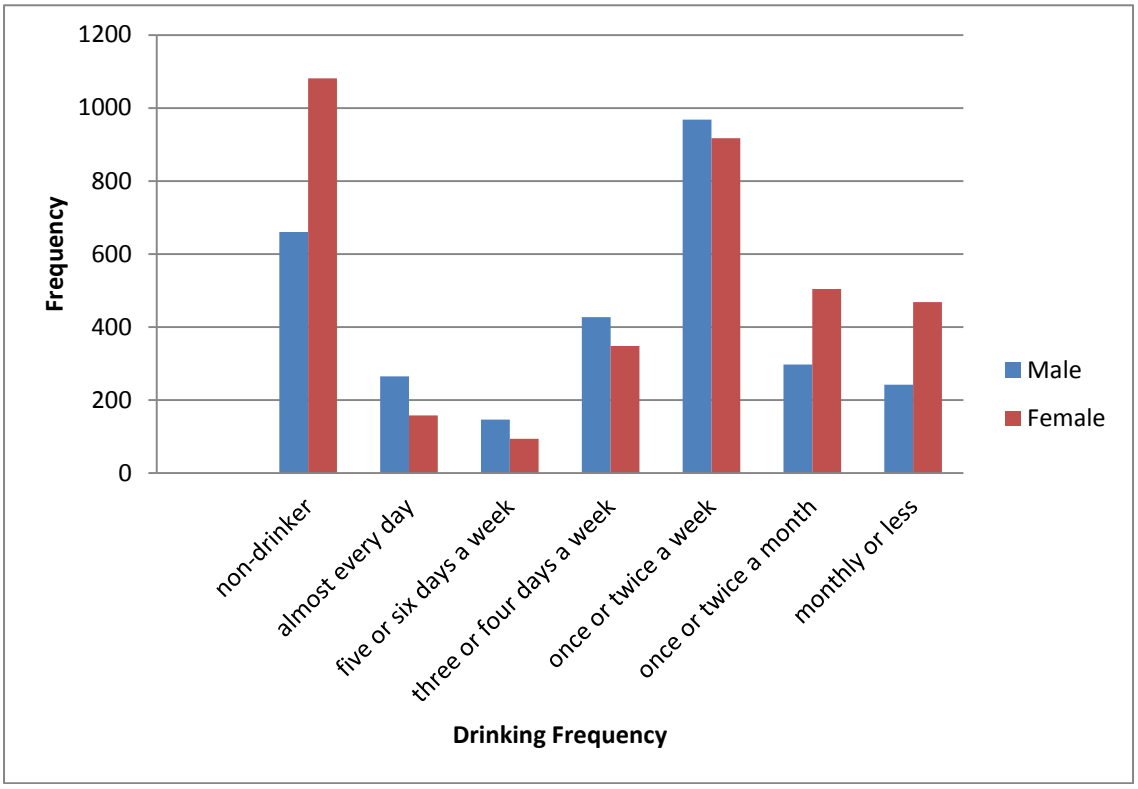


Figure 6-3: Frequency distribution of alcohol intake in the last six months by sex (n = 6576)

6.2.7.2. Comparison between TILDA and SLÁN

Almost half of all SLÁN 2007 respondents (48%) reported that they were current or former smokers with more current smokers found in the 45-64 age category (25%) compared with the 65 plus age category (14%). Similarly, in the TILDA study, over half (56%) of all respondents stated that they were current or former smokers with more current smokers found in the 50-64 years age category (20%) compared with the 65 plus age category (13%). Among the older population in SLÁN 2007, the rate of current smokers was highest for women (27%) than for men (23%) in the younger age group (Table 6.5). However in the same age category in TILDA the prevalence of smoking was the same for both men and women (20%). In both surveys the rate of current smokers was higher for men than for women in the older age category (65 and over). However the differences between men and women in this age group in TILDA was negligible.

Table 6.5: Percentages of current smokers in *SLÁN 2007* & TILDA by gender and age group (n = 6576)

Age Group	SLÁN 2007		TILDA	
	% **Male**	% **Female**	% **Male**	% **Female**
45/50-64	23	27	20	20
65 and over	17	13	13	12

Overall, there appears to be a level of concordance between the rates of alcohol consumption and smoking across the two surveys suggesting some robustness in the measures used to assess these two health behaviours. The marginal differences indicating a higher prevalence of the behaviours among the younger age category in SLÁN 2007 might be explained by the five year age difference in this category (45-64) compared with the same age category in TILDA (50-64).

6.3. Characteristics of the TILDA population

In total, 3006 men and 3570 women were eligible to take part in the study representing a response rate of 85% (Table 6.6). The mean age of both men and women was 63.2 (9.0) years with the majority of the population aged between 50 and 64 years old (59%) and over half of them female (54%). There were significant differences between men and women on all socio-demographic characteristics. Overall women were marginally younger than men with more of them in the 50-64 years category (60%). In education, more men (30%) than women (25%) finished school at primary level whilst more women (61%) completed their education to secondary level. On average, more men (17%) than women (14%) received third level education. Almost three quarters of participants reported that they were currently married (72%) with more men (77%) than women (67%) in this category. Nearly two-fifths reported that they were in social class categories SC1-SC2 (24%) and SC3-SC4 (27%). However in both of these categories there were more men than women (26% vs. 22% and 32% vs. 23% respectively). A significantly larger proportion of men (14%) were farmers compared with just under 2% of women in this category. The majority of participants (37%) were unclassified and a considerable proportion of this category were made up of women (44%) compared with just 28% of men. No significant

differences were seen between men and women and their self-rated health. Overall while men were more likely to report none/mild levels of depression (79%), a higher proportion of women than men suffered from moderate (20% vs. 15% respectively) or severe (11% vs. 6% respectively) levels of depression.

Table 6.6: Socio-demographic characteristic differences and differences in self-rated health and depression between men & women (n = 6576)

	Men (n= 3006)	Women (n=3570)	p value[a]
Age, mean (SD)	63.4 (8.9)	63.0 (9.0)	0.0265
Age years (%)			<.001
55-64	56.3	60.5	
65-74	29.1	24.7	
75 & over	14.7	14.8	
Education (%)			<.001
Primary	29.6	24.6	
Secondary	53.1	61.4	
Tertiary	17.3	14.0	
Social class (%)			<.001
SC1 - SC2	26.2	22.1	
SC3 - SC4	20.9	21.5	
SC5 - SC6	13.8	10.4	
Farmers	11.1	1.7	
Unclassified	28.0	44.3	
Marital status (%)			<.001
Married	77.0	67.1	
Never married	10.5	7.9	
Sep/divorced	5.1	7.4	
Widowed	7.5	17.6	
Self-rated health (%)			
Excellent	15.4	17.6	= 0.181
Very good	29.6	29.3	
Good	32.7	31.7	
Fair	17.8	16.8	
Poor	4.5	4.5	
Depression (%)			<.001
None/mild	79.0	69.3	
Moderate	14.9	19.6	
Severe	6.1	11.1	

Note: Means (standard deviation) are shown for continuous variables and percentages for categorical variables.

a. Derived from one-way t-test for continuous variables and $\chi 2$ test for categorical variables

6.4. Descriptive statistics

6.4.1. Prevalence of alcohol consumption

In the TILDA population overall, both men and women stayed within recommended daily limits of 4 units on a drinking occasion for men and 3 units for women, with men consuming on average 4 units of alcohol per drinking occasion and women consuming 2.5 units.

6.4.1.1. Rates and patterns of alcohol use

All subsequent analyses were conducted on the following alcohol intake groupings: non-drinker (n = 1,666, 25%); moderate drinker (n = 2,948, 45%); and harmful drinker (n = 1,962, 30%). The harmful drinker group is made up from the small proportion of this population who exceeded the weekly recommended drinking limits (n = 417, 21%), and the significantly larger proportion who engaged in binge drinking (n = 1,033, 53%) with 512 (26%) drinkers exceeding more than one of the DOHC guidelines for safe drinking limits outlined below (Copy of Table 5.1.).

Copy of: Table 5.1:

Department of Health and Children (2004) recommended drinking limits for men & women

	Drink limits per week	Drink limits per day	Drink free days
Men	21	4	3
Women	14	3	3

In the univariate analyses, drinking status was assessed with known covariates that included socio-demographic characteristics, other health behaviours (exercise and smoking), the presence of depressive symptoms and self-rated health (Table 6.7). A higher proportion of women than men were non-drinkers, and harmful drinkers tended to be male. The highest proportion of non-drinkers was among the oldest age group (75+) with more harmful drinkers found in the youngest age group. However, it should be noted that as no previous drinking history was obtained in the TILDA study, it is not clear how many of these non-drinkers were formerly harmful drinkers. Non-drinkers were also less likely to be current smokers whereas a high proportion of

harmful drinkers were also current smokers. With regard to marital status, more non-drinkers were seen among those who were widowed whereas more harmful drinkers were found in the separated/divorced category. With the exception of depressive symptoms, all other covariates were found to be significantly associated with drinking status at the $p<.05$ level.

Table 6.7: Characteristics according to alcohol consumption (n = 6576)

Characteristics	Non-drinker	Moderate drinker	Harmful drinker	P value[a]
No of cases	1666	2948	1962	
Age, mean (SD)	67.8 (9.2)	63.2 (8.61)	61.0 (8.3)	<.001
Age years (%)				<.001
55-64	17.4	46.3	36.3	
65-74	32.2	45.3	22.6	
75 & over	43.5	38.8	17.7	
Sex %				<.001
Male	20.3	40.6	39.1	
Female	29.3	48.6	22.2	
Education (%)				<.001
Primary	37.0	37.2	25.9	
Secondary	15.9	46.2	31.6	
Tertiary	22.2	53.6	30.5	
Social class (%)				<.001
SC1 - SC2	16.2	52.2	31.6	
SC3 - SC4	25.6	44.2	30.2	
SC5 - SC6	28.5	38.0	33.5	
Farmer	35.9	42.5	21.6	
Unclassified	28.0	43.2	28.8	
Marital status (%)				<.001
Married	22.7	46.3	31.0	
Never married	29.3	41.8	28.9	
Sep/divorced	21.0	40.0	39.0	
Widowed	38.2	42.0	19.8	
Smoking status (%)				<.001
Never	31.3	48.0	20.7	
Past	20.0	44.6	35.4	
Current	21.0	37.6	41.4	
Physical Activity (%)				<.001
Low	29.9	49.0	21.1	
Moderate	22.7	56.0	21.3	
High	23.0	52.6	24.4	
Self-rated physical health (%)				<.001
Excellent	20.3	48.5	31.2	
Very good	21.9	47.4	30.7	
Good	25.9	43.9	30.2	
Fair	30.9	42.0	27.1	
Poor	37.9	33.8	28.3	
Depressive symptoms (%)				=.232
None/mild	24.6	45.7	29.7	
Moderate	25.9	43.8	30.3	
Severe	27.9	41.3	30.8	

Note: Means (standard deviations) are shown for continuous variables and percentages for categorical variables.

[a] Derived from one-way ANOVA for continuous variables and $\chi 2$ test for categorical variables.

MNLMs were then developed with drinking status in order to examine the independent contributions of measures when entered together. Only those variables that were significantly associated with alcohol consumption as a result of preliminary univariate analyses were considered in the MNLMs. The relationships between the known covariates and drinking status is described below and outlined in Model I & Model II (Table 6.8). As there were no major differences in levels of significance between the known covariates and alcohol use in either model, only the relative risk ratios for the covariates in Model II are mentioned below.

6.4.1.2. The relationship of socio-demographics variables to drinking status

Holding all other variables in the model constant, we can see that increasing age is associated with a decreased risk of being in either the moderate (4%) or harmful drinking (8%) categories. Being female increased the probability of being a non-drinker with women 17% less likely than men to be moderate drinkers and 62% less likely to be harmful drinkers. Individuals with higher levels of education (secondary or tertiary) were less likely to be non-drinkers and more likely to be in either the moderate drinking or harmful drinking categories. Those with a secondary level of education were 46% more likely to be moderate drinkers and those with a tertiary level of education were 75% more likely to be in that drinking category. Education was not protective of harmful drinking with the risk of being in that category increasing from 34% for secondary level to 37% for a tertiary level of education. Significant differences in the relative risks of being a moderate drinker or harmful drinker over a non-drinker were seen across all the social classes when compared to the SC1-SC2 category, with all other categories less likely to be in either the moderate or harmful drinking categories and therefore more likely to be non-drinkers than those in SC1-SC2 category. Being married increased the probability of being a drinker when compared with individuals who never married and who were 28% less likely to be either moderate drinkers or harmful drinkers. No significant differences in the relative risks of being either a moderate drinker or harmful drinker over a non-drinker were seen between those who separated/divorced or widowed and those who were married.

6.4.1.3. The relationship of other health behaviours to drinking status

Holding all other variables in the model constant, significant differences in the relative risks of being a moderate drinker or a harmful drinker over being a non-drinker were seen between those who previously smoked or who currently smoked and those who never smoked. Former smokers were 60% more likely to be moderate drinkers and 172% more likely to be harmful drinkers compared to never smokers. Similarly, current smokers were 32% more likely to be moderate drinkers and 190% more likely to be harmful drinkers compared to never smokers. Therefore, the risk of being a harmful drinker is strongly associated with being a current or a former smoker with the greatest risk seen among current smokers.

Significant differences in the relative risks of being a moderate drinker over being a non-drinker were seen between those who engaged in moderate levels of physical activity and those who engaged in low levels of physical activity. Individuals who engaged in moderate levels of physical activity were 24% more likely to be moderate drinkers compared to those who engaged in low levels of physical activity. No significant differences in the relative risks of being a moderate drinker over being a non-drinker were seen between those who engaged in high levels of physical activity and those who engaged in low levels of physical activity. Neither were there significant differences in the relative risks of being a harmful drinker over being a non-drinker between those who engaged in moderate or high levels of physical activity and those who engaged in low levels of physical activity.

6.4.1.4. The relationship of self-rated health to drinking status

Holding all other variables in the model constant, no significant differences in the relative risks of being a moderate drinker or a harmful drinker over a non-drinker were seen between those who reported their physical health as ‘very good’ or ‘good’ and those who reported their health as ‘excellent’. Significant differences in the relative risks of being a moderate drinker or a harmful drinker over a non-drinker were seen between those who reported their health as ‘fair’ or ‘poor and those who reported their health as ‘excellent’. Those who reported their health as ‘fair’ were 21% less

likely to be moderate drinkers and 34% less likely to be harmful drinkers than those who reported their health as 'excellent'. Similarly, those who reported their health as 'poor' were 45% less likely to be moderate drinkers and 46% less likely to be harmful drinkers than those who reported their health as 'excellent'. In other words, those who reported their health as either 'fair' or 'poor' in relation to those who report their health as excellent, were more likely to be non-drinkers.

Table 6.8: Multinomial logit models with relative risk ratios for the association of ageing self-perceptions & other covariates with drinking behaviour (n = 6576)

Variables	Model I	Model II
Non-drinker	*(omitted)*	*(omitted)*
Moderate drinker		
Age	0.96 (0.94 - 0 .96)***	0.96 (0.95 - 0 .97)***
Gender	0.83 (0.72 - 0.96)**	0.83 (0.72 – 0.96)**
Education (vs. Primary)		
Secondary	1.50 (1.29 - 1.75)***	1.46 (1.25 - 1.70)***
Tertiary	1.86(1.45 - 2.37) ***	1.75 (1.37 - 2.25)***
Social class (vs. SC1 - SC2)		
SC3 - SC4	0.65 (0.52 - 0.80)***	0.65 (0.53 - 0.81)***
SC5 - SC6	0.56 (0.44 - 0.72)***	0.56 (0.44 - 0.74)***
Farmer	0.54 (0.40 - 0.73)***	0.56 (0.41 - 0.75)***
Unclassified	0.56 (0.65 - 0.66)***	0.57 (0.47 - 0.69)***
Marital status (vs. Married)		
Never married	0.72 (0.58 - 0.89)**	0.72 (0.58 - 0.89)***
Sep/divorced	0.80 (0.61 - 1.07)	0.79 (0.60 - 1.04)
Widowed	0.92 (0.76 - 1.12)	0.93 (0.76 - 1.12)
Smoking status (vs. Never)		
Former	1.61 (1.42 - 1.86)***	1.60 (1.39- 1.85)***
Current	1.32 (1.09 - 1.60)**	1.32 (1.09 - 1.60)**
Physical Activity (vs. Low)		
Moderate	1.25 (1.75 - 1.46)**	1.24 (1.06 - 1.45)**
High	1.04 (0.89 - 1.23)	1.02 (0.87 - 1.20)
Self-rated physical health (vs. Excellent)		
Very good	0.99 (0.81 - 1.22)	0.99 (0.81 - 1.22)
Good	0.88 (0.72 - 1.07)	0.88 (0.72 - 1.08)
Fair	0.78 (0.62 - 0.97)*	0.79 (0.63 – 1.00)*
Poor	0.53 (0.38 - 0.74)***	0.55 (0.39 - 0.78)***
Ageing self-perceptions		
Timeline acute/chronic		1.03 (0.95 - 1.13)
Consequences negative		1.03 (0.93 - 1.47)
Control positive		1.12 (1.00 - 1.25)*
Control negative		0.90 (0.81 - 0.99)*

Contd/…

Table 6.8: Multinomial logit models with relative risk ratios for the association of ageing self-perceptions & other covariates with drinking behaviour (continued)

Variables	Model I	Model II
Harmful drinker		
Age	0.92 (0.92 - 0.93)***	0.92 (0.92 - 0.93)***
Gender	0.37 (0.32 - 0.44)***	0.38 (0.33 - 0.44)***
Education (vs. Primary)		
Secondary	1.41 (1.18 – 1.68)***	1.34 (1.14 - 1.62)***
Tertiary	1.47 (1.12 - 1.95)**	1.37 (1.03 - 1.81)*
Social class (vs. SC1 - SC2)		
SC3 - SC4	0.66 (0.52 - 0.84)***	0.67 (0.53 - 0.85)**
SC5 - SC6	0.67 (0.51 – 0.88)**	0.68 (0.52 – 0.85)**
Farmer	0.36 (0.25 - 0.51)***	0.36 (0.26 - 0.52)***
Unclassified	0.55 (0.44 - 0.68)***	0.56 (0.45 - 0.70)***
Marital status (vs. Married)		
Never married	0.73 (0.57 – 0.93)*	0.72 (0.56 – 0.93)***
Sep/divorced	1.12 (0.84 - 1.50)	1.09 (0.81 - 1.46)
Widowed	1.16 (0.77 - 1.23)	0.97 (0.71 - 1.23)
Smoking status (vs. Never)		
Former	2.73 (2.32 - 3.21)***	2.72 (2.31- 3.21)***
Current	2.90 (2.35 - 3.56)***	2.90 (2.36 - 3.57)***
Physical Activity (vs. Low)		
Moderate	1.12 (0.93 - 1.33)	1.11 (0.93 - 1.33)
High	0.95 (0.79 - 1.14)	0.94 (0.78 - 1.13)
Self-rated physical health (vs. Excellent)		
Very good	0.96 (0.77 - 1.20)	0.95 (0.73 - 1.19)
Good	0.87 (0.69 - 1.08)	0.85 (0.68 - 1.06)
Fair	0.67 (0.53 - 0.88**	0.66 (0.50 - 0.85)**
Poor	0.55 (0.38 - 0.79)**	0.54 (0.37 - 0.79)**
Ageing self-perceptions		
Timeline acute/chronic		1.14 (1.02 -1.26)*
Consequences negative		1.07 (0.95 - 1.20)
Control positive		1.15 (1.01 - 1.30)*
Control negative		0.87 (0.78 - 0.97)*

* p<0.05, ** p<0.01, *** p<0.001

Note: Base outcome = Non-drinker

RRR = Relative risk ratios (95% Confidence Interval)

6.4.2. Prevalence of smoking

In the overall TILDA population, one in five older Irish adults was a current smoker with more women (54%) than men in this category (46%) The highest percentage of current smokers reported that they smoked between 20-39 cigarettes per day (41%). They were more likely to have been educated to secondary school level (57%) and to be in the 50-64 year age category (69%).

6.4.2.1. Rates and patterns of smoking

All subsequent analyses were conducted on the following smoking status groupings: never smoker (n = 2,914, 44%); former-smoker (n = 2,550, 38%); and current-smoker (n = 1,112, 17%). The relationship of ageing self-perceptions and other covariates to smoking status was assessed in univariate and multivariate analyses. In the univariate analyses, smoking status was assessed with known covariates that included socio-demographic characteristics, other health behaviours (exercise and drinking), the presence of depressive symptoms and self rated health (Table 6.9). One in five older Irish adults is a current smoker (Appendix C: Table A5). While overall the prevalence of smoking was the same in both men and women (17%), higher rates of smoking were reported in the 50-64 years age group and in adults with primary education. Women were more likely to have never smoked, whereas men are more likely to be former smokers. With regard to marital status, more never smokers were seen among those who were married whereas more current smokers were found in the separated/divorced category. Without exception, all of the covariates were found to be significantly associated with smoking status at the $p<.05$ level.

Table 6.9: Univariate analysis of known covariates associated with smoking status (n = 6576)

Characteristics	Never	Former	Current	P value[a]
No of cases	2914	2550	1112	
Age, mean (SD)	63.2 (9.01)	64.1 (8.98)	60.9 (8.4)	<.001
Age years (%)				<.001
55-64	44.4	35.8	19.8	
65-74	43.7	42.2	14.1	
75 & over	45.1	44.3	10.6	
Sex %				<.001
Male	36.0	47.0	17.0	
Female	51.4	31.8	16.8	
Education (%)				<.001
Primary	37.1	41.0	22.0	
Secondary	46.0	37.1	16.9	
Tertiary	50.5	41.1	8.4	
Social class (%)				<.001
SC1 - SC2	45.6	43.2	11.2	
SC3 - SC4	43.8	41.0	15.3	
SC5 - SC6	34.7	42.1	23.3	
Farmer	53.0	35.9	11.1	
Unclassified	45.5	34.1	20.5	
Marital status (%)				<.001
Married	45.7	39.1	15.3	
Never married	40.6	39.6	19.8	
Sep/divorced	34.5	34.3	31.2	
Widowed	44.3	38.9	16.8	
Drinking status (%)				<.001
Non-drinker	54.9	31.0	14.1	
Moderate drinker	47.4	38.5	14.2	
Harmful drinker	30.7	45.8	23.5	
Physical Activity (%)				= 0.030
Low	43.6	37.5	18.9	
Moderate	45.2	39.6	15.2	
High	44.1	39.1	16.9	
Self-rated physical health (%)				<.001
Excellent	53.1	34.2	12.6	
Very good	48.0	37.9	14.2	
Good	43.2	39.9	17.0	
Fair	35.4	41.9	22.7	
Poor	30.2	41.7	28.1	
Depressive symptoms (%)				<.001
None/mild	46.0	39.4	14.6	
Moderate	41.9	38.2	19.9	
Severe	36.0	35.5	28.5	

Note: Means (standard deviations) are shown for continuous variables and percentages for categorical variables.

[a] Derived from)=One-way ANOVA for continuous variables and $\chi 2$ test for categorical variables.

6.4.2.2. The relationship of socio-demographics variables to smoking status

MNLMs were then developed with smoking in order to examine the independent contributions of measures when entered together. Only those variables that were significantly associated with smoking as a result of preliminary univariate analyses were considered in the MNLMs.

The relationships between the known covariates and smoking is described below and outlined in Model I & Model II (Table 6.10). As there were no major differences in levels of significance between the known covariates and smoking in either model, only the relative risk ratios for the covariates in Model II are mentioned below.

Holding all other variables in the model constant, we can see that increasing age is associated with an increased risk of being a former smoker (2%) and with a decreased risk of being a current smoker (4%). Being female increased the probability of being a never smoker where women were 52% less likely to be former smokers and 34% less likely to be current smokers. Higher levels of education was associated with an increased risk of being a never smoker, with those with a secondary level of education being 25% less likely to be former smokers, and those with a tertiary level of education being 34% less likely when compared with a primary level of education. Individuals with secondary or tertiary levels of education were also less likely to be current smokers than those with a primary level of education (44% & 74% respectively). Significant differences in the relative risks of being a former smoker over a never smoker were seen in only two social class categories when compared to the SC1-SC2 category. Participants in the farmer and unclassified social class categories were 50% and 8% (respectively) less likely to be former smokers, and therefore more likely to be never smokers when compared with those in the SC1-SC2 category. Significant differences in the relative risks of being a current smoker over a never smoker were also seen in two social classes when compared with the SC1-SC2 category. Participants in the SC5 - SC6 were 53% more likely to be current smokers than never smokers than those in SC1-SC2 category. On the other hand, farmers were 5% less likely to be current smokers and therefore more likely to be never smokers compared with those in SC1-SC2 category. No significant differences in the relative risks of being a former

smoker over a never smoker were seen between those who were married and those in the other three marital status categories. However, significant differences in the relative risks of being a current smoker over a never smoker were seen between those who were married and those in the other three marital status categories. Over and above those who were married, those in the other three categories were more likely to be current smokers than never smokers with those who never married being 50% more likely, those who were separated/divorced 144% more likely and those who were widowed 60% more likely.

6.4.2.3. The relationship of other health behaviours to smoking status

Holding all other variables in the model constant, significant differences in the relative risks of being a former smoker or a current smoker over being a never smoker were seen between moderate drinkers or harmful drinkers over non-drinkers. Former smokers were more likely to be moderate drinkers (62%) or harmful drinkers (167%) when compared to non-drinkers. Similarly, current smokers were more likely to be found among moderate drinkers (37%) and harmful drinkers (167%) when compared to non-drinkers. Therefore, being a moderate or a harmful drinker is very strongly associated with tobacco consumption with moderate and harmful drinkers at risk for being current smokers and this risk is significantly heightened among harmful drinkers. No significant differences in the relative risks of being a former smoker or a current smoker over being a never smoker were seen between those who engaged in moderate or high levels of physical activity or those who engaged in low levels. Therefore there was no relationship between smoking status and physical activity levels.

6.4.2.4. The relationship of self-rated health to smoking status

Holding all other variables in the model constant, significant differences in the relative risks of being a former smoker or a current smoker over being a never smoker were seen between individuals in most of the other self-rated health categories and those who reported their health as ‘excellent’. Former smokers were more likely to report their health as very good (19%), good (39%), fair (83%) or poor (127%) when compared

with those who reported their health as excellent. Similarly, current smokers were more likely to report their health as good (43%), fair (117%) or poor (171%) when compared with those who reported their health as excellent. No significant difference was seen in the current smoker category between those who reported their health as very good and those who reported their health as 'excellent'. Therefore, the greatest risk of reporting one's health as fair or poor was seen in the former or current smoker categories.

6.4.2.5. The relationship of depression to smoking status

No significant differences in the relative risks of being a former smoker or a current smoker over being a never smoker were seen between those who reported moderate levels of depression and those who reported none/mild levels of depression. However, while no significant difference in the relative risks of being a former smoker over being a never smoker were seen between those who reported severe levels of depression and those who reported none/mild levels of depression, significant difference in the relative risks of being a current smoker over being a never smoker were seen between those who reported severe levels of depression and those who reported none/mild levels of depression. Individuals who reported severe levels of depression were 52% more likely to be current smokers when compared with those who reported none/mild levels of depression. Therefore, individuals with severe levels of depression are more likely to be current smokers.

Table 6.10: Multinomial logit models with relative risk ratios for the association of ageing self-perceptions & other covariates with smoking behaviour (n = 6576)

Variables	Model I	Model II
Never smoker	*(omitted)*	*(omitted)*
Former smoker		
Age	1.01 (1.01 - 1.02)***	1.02 (1.01 - 1.03)***
Gender	0.51 (0.45 - 0.58)***	0.48 (0.43 - 0.55)***
Education (vs. Primary)		
Secondary	0.77 (0.66 - 0.89)***	0.75 (0.68 - 0.87)***
Tertiary	0.68 (0.55 - 0.83)***	0.66 (0.54 - 0.82)***
Social class (vs. SC1 - SC2)		
SC3 - SC4	0.92 (0.77 - 1.11)	0.92 (0.77 - 1.11)
SC5 - SC6	1.07 (0.86 - 1.33)	1.07 (0.86 - 1.33)
Farmer	0.43 (0.37 - 0.64)***	0.50 (0.38 - 0.66)***
Unclassified	0.81 (0.69 - 0.96)*	0.82 (0.70 - 0.97)*
Marital status (vs. Married)		
Never married	1.13 (0.93 - 1.39)	1.14 (0.93 - 1.39)
Sep/divorced	1.23 (0.96 - 1.59)	1.22 (0.95 - 1.57)
Widowed	1.07 (0.89 - 1.28)	1.09 (0.90 - 1.31)
Drinking status (vs. Non-drinker)		
Moderate drinker	1.65 (1.43 - 0.90)***	1.62 (1.40 - 1.87)***
Harmful drinker	2.72 (2.31 - 3.20)***	2.67 (2.27 - 3.15)***
Physical Activity (vs. Low)		
Moderate	1.05 (0.91 - 1.20)	1.03 (0.89 - 1.18)
High	1.06 (0.91 - 1.23)	1.04 (0.89 - 1.20)
Self-rated physical health (vs. Excellent)		
Very good	1.19 (1.00 - 1.41)*	1.19 (1.00 - 1.41)*
Good	1.37 (1.16 - 1.63)***	1.39 (1.16 - 1.65)***
Fair	1.78 (1.45 - 2.18)***	1.83 (1.49 - 2.26)***
Poor	2.14 (1.53 - 2.98)***	2.27 (1.62 - 3.18)***
Depressive symptoms (vs. None/mild**)**		
Moderate	1.04 (0.89 - 1.21)	1.02 (0.88 - 1.20)
Severe	1.12 (0.90 - 1.39)	1.07 (0.86 - 1.35)
Ageing self-perceptions		
Timeline acute/chronic		0.94 (0.86 - 1.02)
Timeline cyclical		1.10 (1.00 - 1.21)*
Consequences positive		0.96 (0.88 - 1.05)
Consequences negative		0.89 (0.81 - 0.98)*
Control positive		0.96 (0.87 - 1.07)
Control negative		0.92 (0.85 - 1.00)
Emotional representation		1.11 (0.99 - 1.24)

Contd/…

Table 6.10: Multinomial logit models with relative risk ratios for the association of ageing self-perceptions & other covariates with smoking behaviour (continued)

Variables	Model I	Model II
Current smoker		
Age	0.96 (0.95 - 0.97)***	0.96 (0.95 - 0.97)***
Gender	0.69 (0.58 - 0.80)***	0.66 (0.56 - 0.78)***
Education (vs. Primary)		
Secondary	0.55 (0.46 - 0.65)***	0.56 (0.46 - 0.67)***
Tertiary	0.25 (0.18 - 0.34)***	0.26 (0.19 - 0.36)***
Social class (vs. SC1 - SC2)		
SC3 - SC4	0.95 (0.74 - 1.22)	0.93 (0.73 - 1.20)
SC5 - SC6	1.57 (1.19 - 2.09)*	1.53 (1.15 - 2.03)*
Farmer	0.51 (0.34 - 0.76)**	0.50 (0.33 - 0.75)**
Unclassified	1.10 (0.88 - 1.38)	1.09 (0.87 - 1.36)
Marital status (vs. Married)		
Never married	1.51 (1.17 - 1.95)**	1.50 (1.16 - 1.94)*
Sep/divorced	2.42 (1.84 - 3.18)***	2.44 (1.86 - 3.21)***
Widowed	1.59 (1.24 - 2.03)***	1.60 (1.25 - 2.04)***
Drinking status (vs. Non-drinker)		
Moderate drinker	1.34 (1.13 - 1.67)**	1.37 (1.13 - 1.67)*
Harmful drinker	2.89 (2.34 - 3.57)***	2.87 (2.32 - 3.55)***
Physical Activity (vs. Low)		
Moderate	0.85 (0.71 - 1.02)	0.85 (0.70 - 1.02)
High	0.94 (0.78 – 1.36)	0.94 (0.78 - 1.14)
Self-rated physical health (vs. Excellent)		
Very good	1.16 (0.91 - 1.47)	1.15 (0.90 - 1.47)
Good	1.45 (1.14 - 1.83)**	1.43 (1.13 - 1.82)*
Fair	2.19 (1.67 - 2.86)***	2.17 (1.65 - 2.85)***
Poor	2.47 (1.66 - 3.69)**	2.51 (1.67 - 3.77)***
Depressive symptoms (vs. None/mild**)**		
Moderate	1.22 (1.01 - 1.49)*	1.19 (0.98 - 1.46)
Severe	1.61 (1.26 - 2.07)***	1.52 (1.17 - 1.96)*
Ageing self-perceptions		
Timeline acute/chronic		1.05 (0.94 - 1.18)
Timeline cyclical		1.06 (0.93 - 1.21)
Consequences positive		0.98 (0.88 - 1.11)
Consequences negative		0.80 (0.70 - 0.91)**
Control positive		0.94 (0.82 - 1.08)
Control negative		1.13 (1.01 - 1.27)*
Emotional representation		1.17 (0.97 - 1.29)

* p<0.05, ** p<0.01, *** p<0.001

Note: Base outcome = Non-drinker

RRR = Relative risk ratios (95% Confidence Interval)

6.4.3. Significance of ageing self-perceptions

6.4.3.1. Socio-demographic variation in ageing self-perceptions

The relationship of key socio-demographic variables as well as self-rated health to ageing self-perceptions was assessed in univariate and multivariate analyses. In addition to the ANOVAs, the Mann-Whitney U Test for comparing median score differences between males and females as well as the Kruskal-Wallis H Test for comparing median scores between the three age groups were also employed. These two additional tests were run based on earlier concerns about the normal distribution of APQ domains. These procedures are considered to be suitable non-parametric alternatives to analysis of variance (ANOVA) (Pevalin *et al.*, 2009). However, as no substantive differences between the results obtained from ANOVA and from the Mann-Whitney and Kruskal-Wallis tests, the findings reported here are those using the ANOVA. In addition post-hoc comparison (Scheffé test) was used to illuminate the nature of the observed difference in mean scores.

Univariate results (Table 6.11) using one-way analyses of variance indicated that both timeline acute/chronic and timeline cyclical were positively associated with age, marital status and self-rated health. The results indicate that as participants aged they perceived increased reminders of their ageing and were more chronically aware of it. Similar patterns were observed between those who were not currently married and those with increasing poorer health when compared with those who were married or in excellent health. Education was negatively associated with both timeline acute/chronic and timeline cyclical while gender was negatively associated with timeline cyclical but positively associated with timeline acute/chronic. The results indicate that participants with lower levels of education perceived increased reminders of their ageing and were more chronically conscious of it compared with those with higher levels of education. While men were more chronically aware of their ageing, women perceived more reminders of it.

Consequences positive was negatively associated with age but positively associated with gender, self-rated health and education with no association found with marital

status. This indicates that older participants perceived fewer positive outcomes associated with ageing compared with younger participants. However, more women than men, those with better self-rated health and higher levels of education perceived more positive outcomes associated with the ageing process. Consequences negative, was negatively associated with gender, education and marital status and positively associated with age and self-rated health.

Control positive was positively associated with gender, education and marital status and negatively associated with age and self-rated health. Control negative was negatively associated with gender and education and positively associated with age, marital status and self-rated health.

Emotional representation was positively associated with age, gender, marital status and self-rated health and negatively associated with education. Differences in ageing self-perceptions by age group and gender were then examined using multi-variate analyses.

Table 6.11: Socio-demographic & self-rated health variation in ageing self-perceptions (n = 6576)

Characteristics	Timeline-acute/chronic	Timeline-cyclical	Consequences-positive	Consequences-negative	Control-positive	Control-negative	Emotional-representation
Age years	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001
55-64	2.50 (.82)	2.60 (.83)	3.86 (.67)	2.65 (.81)	4.00 (.59)	2.67 (.79)	2.25 (.78)
65-74	2.67 (.86)	2.73 (.83)	3.72 (.73)	2.96 (.80)	3.94 (.56)	2.94 (.80)	2.29 (.77)
75 & over	3.05 (.89)	2.90 (.87)	3.68 (.73)	3.43 (.80)	3.80 (.61)	3.28 (.83)	2.42 (.82)
Sex	p<.001	p<.001	p<.001	p<.001	p<.01	p<.001	p<.001
Male	2.72 (.84)	2.60 (.82)	3.75 (.67)	2.94 (.82)	3.93 (.57)	3.13 (.80)	2.24 (.76)
Female	2.55 (.88)	2.75 (.86)	3.83 (.72)	2.75 (.87)	3.98 (.60)	3.21 9.84)	2.33 (.80)
Education	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001
Primary	2.83 (.92)	2.77 (.88)	3.72 (.76)	3.10 (.89)	3.84 (.62)	3.19 (.85)	2.41 (.84)
Secondary	2.56 (.84)	2.67 (.82)	3.81 (.67)	2.77 (.83)	3.97 (.56)	2.76 (.79)	2.28 (.76)
Tertiary	2.52 (.81)	2.56 (.81)	3.86 (.67)	2.70 (.79)	4.11 (.56)	2.46 (.69)	2.11 (.71)
Marital status	p<.001	p<.001	P= 0.3152	p<.001	p<.01	p<.001	p<.001
Married	2.57 (.85)	2.63 (.84)	3.80 (.69)	2.79 (.83)	3.97 (.58)	2.78 (.82)	2.26 (.77)
Never married	2.74 (.88)	2.79 (.84)	3.76 (.70)	2.97(.88)	3.92 (.59)	2.95 (.81)	2.36 (.80)
Sep/divorced	2.59 (.85)	2.76 (.85)	3.80 (.68)	2.76 (.88)	4.02 (.58)	2.67 (.79)	2.32 (.81)
Widowed	2.87 (.92)	2.83 (.85)	3.77 (.75)	3.14 (.86)	3.89 (.62)	3.08 (.85)	2.39 (.81)
Self-rated health	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001	p<.001
Excellent	2.31 (.80)	2.38 (.83)	3.90 (.68)	2.45 (.81)	4.06 (.61)	2.54 (.80)	2.00 (.71)
Very good	2.49 (.82)	2.58 (.80)	3.81 (.69)	2.69 (.80)	4.00 (.56)	2.69 (.78)	2.18 (.70)
Good	2.70 (.83)	2.74 (.82)	3.79 (.68)	2.91 (.81)	3.93 (.56)	2.87 (.79)	2.34 (.77)
Fair	2.93 (.87)	2.94 (.80)	3.70 (.73)	3.24 (.78)	3.84 (.60)	3.13 (.78)	2.56 (.80)
Poor	3.02 (.98)	3.03 (.90)	3.71 (.78)	3.47 (.88)	3.82 (.66)	3.31 (.92)	2.69 (.96)

Note: Means (standard deviations) are displayed

6.4.3.2. Age-group differences in ageing self-perceptions

Age-group differences in ageing self-perceptions are reported in Table 6.12. Results from the ANCOVAs showed that in the seven subscales of views on ageing there were significant differences between the three age groups on mean scores across all seven of the domains: timeline acute/chronic ($F(2, 6575) = 126.96$, $p<.001$); timeline cyclical ($F(2, 6575) = 52.05$, $p<.0001$); consequences positive ($F(2, 6571) = 27.58$, $p<.001$); consequences negative ($F(2, 6575) = 317.01$, $p<.001$); control positive ($F(2, 6575) = 36.20$, $p<.001$); control negative ($F(2, 6575) = 179.32$, $p<.001$) and emotional representation $F(2, 6575) = 15.06$, $p<.001$). Post hoc analyses using the Scheffé test indicated that the mean scores were significantly different ($p<.001$) between the youngest age groups (50-64 years), the middle age groups (65-74 years) and the oldest age groups (75+ years) across six of the seven domains. In addition, significant differences ($p<.001$) were seen between the middle age group and the oldest age group across all but one of the domains, consequences positive.

The post hoc analyses indicated that on the timeline subscales participants in all three age categories were more cyclically aware of their ageing than they were chronically conscious of it, reporting increased reminders (e.g. awareness of ageing changes from day-to-day) and more chronic awareness of their ageing (e.g. always classify myself as old) as they moved into the next age category. On the consequences subscales, all three age categories perceived positive consequences to the ageing process. However those in the oldest age category were more negative about ageing consequences (e.g. loss of independence). Similarly for the control subscales, in each of the age categories participants perceived control over the positive aspects of ageing (e.g. greater appreciation of things) but were less in control of the negative aspects (e.g. poorer mobility). Once again, older age was associated with a diminished sense of control. In the emotional representation domain significant differences were seen only between the youngest age group (50-64) and the oldest age group (75+ years) ($p<001$), indicating that the younger age had less of a negative emotional response to getting older than the oldest age group. However TILDA's oldest participants were grouped around the middle of the scale (Neither agree nor disagree) for many of the mean

scores on each of the APQ domains indicating some level of ambivalence about both the positive and negative aspects of ageing.

Table 6.12: Age-group differences in self-perceptions of ageing (n = 6576)

Views about ageing	50-64 years	65-74 years	75 + years	Significance	F
Timeline acute/chronic	2.50 (0.83)	2.67 (0.86)	3.04 (0.88)	<.001	$F_{(2,6575)}$= 126.96
Timeline cyclical	2.60 (0.83)	2.73 (0.83)	2.90 (0.87)	<.001	$F_{(2,6575)}$= 52.07
Consequences positive	3.86 (0.67)	3.73 (0.73)	3.68 (0.72)	<.001	$F_{(2,6575)}$= 27.58
Consequences negative	2.67 (0.81)	2.97 (0.81)	3.43 (0.80)	<.001	$F_{(2,6575)}$= 317.01
Control positive	4.00 (0.59)	3.94 (0.55)	3.80 (0.62)	<.001	$F_{(2,6575)}$= 36.20
Control negative	2.67 (0.78)	2.94 (0.80)	3.28 (0.83)	<.001	$F_{(2,6575)}$=179.32
Emotional representation	2.25 (0.78)	2.30 (0.77)	2.43 (0.81)	<.001	$F_{(2,6575)}$=15.06

Note: Means (standard deviations) are displayed

6.4.3.3. Gender differences in self-perceptions of ageing

Gender differences in ageing self-perceptions are reported in Table 6.13. Results from the ANCOVAs show that there were significant differences between men and women with regard to their views about ageing across all seven of the domains even when controlling for other socio-demographic and self-rated health variables. Post hoc analyses using the Scheffé test indicated that on the timeline subscales women were more occasionally aware of their ageing ($F(1, 6575) = 42.20$, $p<.001$) than they were chronically conscious of it ($F(1, 6575) = 62.17$, $p<.001$). On the consequences subscales, women perceived more positive consequences to the ageing process ($F(1, 6575) = 20.21$, $p<.0001$) and were also more positive about the negative consequences associated with ageing ($F(1, 6575) = 58.94$, $p<.001$). On the control subscales, once again women perceived more control over both the positive ($F(1, 6575) = 14.77$, $p<.001$) and the negative ($F(1, 6575) = 18.31$, $p<.001$) aspects of ageing. On the emotional representation subscale, women perceived more negative responses to ageing than their male counterparts ($F(1, 6575) = 17.85$, $p<.001$). Overall, women

report more positive beliefs about ageing than men but they have stronger emotional responses to the ageing process.

Table 6.13: Gender differences in ageing self-perceptions (n = 6576)

Views about ageing	Men (SD)	Women (SD)	Significance	F
Timeline acute/chronic	2.72 (0.84)	2.55 (0.88)	<.001	$F_{(1,6575)}$= 62.17
Timeline cyclical	2.60 (0.82)	2.75 (0.86)	<.001	$F_{(1,6575)}$= 42.20
Consequences positive	3.75 (0.68)	3.83 (0.72)	<.001	$F_{(1,6575)}$= 20.21
Consequences negative	2.94 (0.82)	2.84 (0.87)	<.001	$F_{(1,6575)}$= 58.94
Control positive	3.93 (0.57)	3.98 (0.60)	=.001	$F_{(1,6575)}$= 14.77
Control negative	2.87 (0.80)	2.79 (0.84)	<.001	$F_{(1,6575)}$= 18.31
Emotional representation	2.24 (0.76)	2.33 (0.80)	<.001	$F_{(1,6575)}$=17.85

Note: Means (standard deviations) are displayed

6.4.4. Ageing self-perceptions and alcohol consumption

In additional preliminary univariate analyses, the relationship between drinking status and ageing self-perceptions was also examined and three of the seven APQ domains were not found to be significantly associated with smoking status at the p<.05 level using a one-way analysis of variance (Appendix C: Table A3). These were timeline cyclical, consequences positive and emotional representation. A one way analysis of variance showed significant effects of the remaining APQ domains.

Post hoc analyses using the Scheffé post hoc criterion for significance indicated that chronic awareness of ageing was significantly lower in the moderate drinker condition (M = 2.58, SD = 0.84) than in the other two conditions, non-drinker (p <.001) and harmful drinker (p = 0.026). There was no significant difference between the non-drinker and harmful drinker conditions (p = 0.120). Post hoc analyses also indicated less awareness of the negative consequences to ageing in the moderate drinker (M = 2.80, SD = 0.83) and also in the harmful drinker conditions (M = 2.82, SD = 0.82) compared with the non-drinker condition (p < .001). There was no significant difference between the moderate drinker and harmful drinker conditions (p = 0.809). Significant differences in individual perceptions of control over positive ageing experiences were seen, with significantly higher levels of control experienced in the moderate drinker (M = 3.99, SD = 0.63) and harmful drinker conditions (M = 3.98, SD =

0.57) compared with the non-drinker condition ($p < .001$). Once again there was no significant difference between the moderate drinker and harmful drinker conditions ($p = 0.878$). Finally, significant differences in individual perceptions of control over negative ageing experiences were seen, with higher levels of control experienced in the moderate drinker ($M = 2.77$, $SD = 0.79$) and harmful drinker conditions ($M = 2.77$, $SD = 0.81$) compared with the non-drinker condition ($p < 0.001$). Again there was no significant difference between the moderate drinker and harmful drinker conditions ($p = 0.998$).

6.4.5. The relationship of ageing self-perceptions to drinking status

The relationship between ageing self-perceptions and drinking status was assessed in Model II of the MNLM (Copy of Table 6.8). Whilst established covariates were entered on the first step, ageing self-perceptions were entered on the second step. This sequence was adopted in order to determine the contribution of the APQ domains even after controlling for other more traditional covariates of alcohol. Only those variables that were significantly associated with alcohol use as a result of preliminary univariate analyses were considered in the MNLMs. These results are described here dealing with each of the study hypotheses in turn. The coefficients from Model II were then used to assess the marginal effects for the probabilities of being a moderate drinker or a harmful drinker in relation to the APQ variables (Appendix C: Table A4).

6.4.5.1. Hypothesis 1a: Timeline and alcohol consumption

The hypothesis that higher mean scores on the timeline domains would be related to alcohol consumption was partially supported (hypothesis 1a). Timeline cyclical was not examined in the multivariate model as univariate analysis showed that whether the individual had a stable or unstable cyclical ageing timeline was not related to their drinking status. No significant differences in the relative risks of being a moderate drinker over a non-drinker were seen between individuals with either a chronic or a less chronic ageing timeline, once other variables in the model were held constant. However, the risk of being a harmful drinker - relative to a non-drinker, would be expected to increase by a factor of 1.14, once other variables in the model are held

constant for those individuals with a strong chronic ageing timeline. The marginal effects after the MNLM showed that a one unit increase on the timeline acute/chronic scale did not affect the probability of being either a moderate drinker (y = Pr(moderate drinker) (predict) = 0.002 (p= 0.835)) or a harmful drinker (y = Pr(moderate drinker) (predict) = 0.014 (p= 0.129)). Therefore the results of the MNLM and the marginal effects indicate that an individual who is constantly preoccupied with their experiences of age or ageing would be 14% more likely to be a harmful drinker than a non-drinker but no differences in the risks of being a moderate drinker over a harmful drinker were noted.

6.4.5.2. Hypothesis 2a: Consequences and alcohol consumption

The hypothesis that higher mean scores on the consequences domains would be related to levels of alcohol consumption was not supported (hypothesis 2a). Consequences positive was not examined in the multivariate model as univariate analysis showed beliefs that individuals had regarding the positive consequences of ageing were not related to their drinking status. No significant differences in the relative risks of being a moderate or harmful drinker relative to a non-drinker were seen between those who perceived their own ageing as having varying levels of negative ageing consequences, once other variables in the model were held constant. The marginal effects after the MNLM showed that a one unit increase on the consequences negative scale did not affect the probability of being either a moderate drinker (y = Pr(moderate drinker) (predict) = -0.004 (p= 0.693)) or a harmful drinker (y = Pr(harmful drinker) (predict) = 0.012 (p= 0.242)). Therefore the results of the MNLM and the marginal effects indicate that an individual's outlook regarding the consequences of ageing had no impact on their drinking status once all other variables are considered.

6.4.5.3. Hypothesis 3a: Control and alcohol consumption

The hypothesis that higher mean scores domains would be related to alcohol consumption was partially supported (hypothesis 3a). Significant differences in the relative risks of being a moderate or harmful drinker relative to a non-drinker were

seen between individuals who perceived varying levels of control over both the positive and negative aspects of ageing, once other variables in the model were held constant. The risk of being a moderate drinker - relative to a non-drinker - for individuals who perceived more control over the positive aspects of ageing would be expected to increase by a factor of 1.12, once other variables in the model are held constant. Contrary to the study hypothesis, an individual's risk of being a harmful drinker relative to a non-drinker would be expected to increase by a factor of 1.15 once other variables in the model are held constant. The marginal effects after the MNLM showed that a one unit increase on the control positive scale did not affect the probability of being either a moderate drinker (y = Pr(moderate drinker) (predict) = 0.009 (p= 0.482)) or a harmful drinker (y = Pr(harmful drinker) (predict) = 0.013 (p= 0.244)). Therefore in this study, an individual who perceived that they were in control over positive ageing experiences would be 12% more likely to be a moderate drinker and 15% more likely to be a harmful drinker.

Furthermore, the risk of being a moderate drinker - relative to a non-drinker - for individuals who perceived less control over the negative aspects of ageing, would be expected to decrease by a factor of 0.90, once other variables in the model are held constant. In addition, their risk of being a harmful drinker relative to a non-drinker would be expected to decrease by a factor of 0.87, once other variables in the model are held constant. The marginal effects after the MNLM showed that a one unit increase on the control negative scale did not affect the probability of being either a moderate drinker (y = Pr(moderate drinker) (predict) = -0.016 (p= 0.129)) or a harmful drinker (y = Pr(harmful drinker) (predict) = -0.007 (p= 0.474)). Therefore an individual who perceived more control over negative ageing experiences would be 10% less likely to be a moderate drinker than a non-drinker and 13% less likely to be a harmful drinker. However, no significant differences were noted in the probabilities for being either a moderate drinker or a harmful drinker on either of the two control domains.

6.4.5.4. Hypothesis 4a: Emotional representation and alcohol consumption

The hypothesis that higher mean scores on the emotional representation domain will be related to alcohol consumption was not supported (hypothesis 4a). Emotional

representation was not examined in the multivariate model as univariate analysis showed that levels of emotions experienced regarding age or ageing was not related to drinking status.

Copy of Table 6.8: Multinomial logit models with relative risk ratios for the association of ageing self-perceptions & other covariates with drinking behaviour (n = 6576)

Variables	Model I	Model II
Non-drinker	*(omitted)*	*(omitted)*
Moderate drinker		
Age	0.96 (0.94 - 0 .96)***	0.96 (0.95 - 0 .97)***
Gender	0.83 (0.72 - 0.96)**	0.83 (0.72 – 0.96)**
Education (vs. Primary)		
Secondary	1.50 (1.29 - 1.75)***	1.46 (1.25 - 1.70)***
Tertiary	1.86(1.45 - 2.37) ***	1.75 (1.37 - 2.25)***
Social class (vs. SC1 - SC2)		
SC3 - SC4	0.65 (0.52 - 0.80)***	0.65 (0.53 - 0.81)***
SC5 - SC6	0.56 (0.44 - 0.72)***	0.56 (0.44 - 0.74)***
Farmer	0.54 (0.40 - 0.73)***	0.56 (0.41 - 0.75)***
Unclassified	0.56 (0.65 - 0.66)***	0.57 (0.47 - 0.69)***
Marital status (vs. Married)		
Never married	0.72 (0.58 - 0.89)**	0.72 (0.58 - 0.89)***
Sep/divorced	0.80 (0.61 - 1.07)	0.79 (0.60 - 1.04)
Widowed	0.92 (0.76 - 1.12)	0.93 (0.76 - 1.12)
Smoking status (vs. Never)		
Former	1.61 (1.42 - 1.86)***	1.60 (1.39- 1.85)***
Current	1.32 (1.09 - 1.60)**	1.32 (1.09 - 1.60)**
Physical Activity (vs. Low)		
Moderate	1.25 (1.75 - 1.46)**	1.24 (1.06 - 1.45)**
High	1.04 (0.89 - 1.23)	1.02 (0.87 - 1.20)
Self-rated physical health (vs. Excellent)		
Very good	0.99 (0.81 - 1.22)	0.99 (0.81 - 1.22)
Good	0.88 (0.72 - 1.07)	0.88 (0.72 - 1.08)
Fair	0.78 (0.62 - 0.97)*	0.79 (0.63 – 1.00)*
Poor	0.53 (0.38 - 0.74)***	0.55 (0.39 - 0.78)***
Ageing self-perceptions		
Timeline acute/chronic		1.03 (0.95 - 1.13)
Consequences negative		1.03 (0.93 - 1.47)
Control positive		1.12 (1.00 - 1.25)*
Control negative		0.90 (0.81 - 0.99)*

Contd/…

Copy of Table 6.8: Multinomial logit models with relative risk ratios for the association of ageing self-perceptions & other covariates with drinking behaviour (continued)

Variables	Model I	Model II
Harmful drinker		
Age	0.92 (0.92 - 0.93)***	0.92 (0.92 - 0.93)***
Gender	0.37 (0.32 - 0.44)***	0.38 (0.33 - 0.44)***
Education (vs. Primary)		
Secondary	1.41 (1.18 – 1.68)***	1.34 (1.14 - 1.62)***
Tertiary	1.47 (1.12 - 1.95)**	1.37 (1.03 - 1.81)*
Social class (vs. SC1 - SC2)		
SC3 - SC4	0.66 (0.52 - 0.84)***	0.67 (0.53 - 0.85)**
SC5 - SC6	0.67 (0.51 – 0.88)**	0.68 (0.52 – 0.85)**
Farmer	0.36 (0.25 - 0.51)***	0.36 (0.26 - 0.52)***
Unclassified	0.55 (0.44 - 0.68)***	0.56 (0.45 - 0.70)***
Marital status (vs. Married)		
Never married	0.73 (0.57 – 0.93)*	0.72 (0.56 – 0.93)***
Sep/divorced	1.12 (0.84 - 1.50)	1.09 (0.81 - 1.46)
Widowed	1.16 (0.77 - 1.23)	0.97 (0.71 - 1.23)
Smoking status (vs. Never)		
Former	2.73 (2.32 - 3.21)***	2.72 (2.31- 3.21)***
Current	2.90 (2.35 - 3.56)***	2.90 (2.36 - 3.57)***
Physical Activity (vs. Low)		
Moderate	1.12 (0.93 - 1.33)	1.11 (0.93 - 1.33)
High	0.95 (0.79 - 1.14)	0.94 (0.78 - 1.13)
Self-rated physical health (vs. Excellent)		
Very good	0.96 (0.77 - 1.20)	0.95 (0.73 - 1.19)
Good	0.87 (0.69 - 1.08)	0.85 (0.68 - 1.06)
Fair	0.67 (0.53 - 0.88**	0.66 (0.50 - 0.85)**
Poor	0.55 (0.38 - 0.79)**	0.54 (0.37 - 0.79)**
Ageing self-perceptions		
Timeline acute/chronic		1.14 (1.02 -1.26)*
Consequences negative		1.07 (0.95 - 1.20)
Control positive		1.15 (1.01 - 1.30)*
Control negative		0.87 (0.78 - 0.97)*

* p<0.05, ** p<0.01, *** p<0.001

Note: Base outcome = Non-drinker

RRR = Relative risk ratios (95% Confidence Interval)

6.4.6. Ageing self-perceptions and smoking

In additional preliminary univariate analyses, the relationship between smoking status and ageing self-perceptions was also examined and each of the seven APQ domains were found to be significantly associated with smoking status at the p<.05 level using a one-way analysis of variance (Appendix C: Table A6).

Post hoc analyses using the Scheffé post hoc criterion for significance indicated that chronic awareness of ageing was significantly higher in the former smoker condition

(M = 2.64, SD = 0.85) and in the current smoker condition (M = 2.71, SD = 0.87) than in the never smoker condition (p = 0.016 & p <.001 respectively). There was no significant difference between the former smoker and current smoker conditions (p = 0.107). On the timeline cyclical domain increased reminders of ageing were seen both in the former smoker condition (M = 2.70, SD = 0.83) and in the current smoker condition (M = 2.77, SD = 0.87) compared with the never smoker condition (p = 0.011 & p <.001 respectively). There was no significant difference between the former smoker and current smoker conditions (p = 0.060). Post hoc analyses also indicated that levels of awareness of the positive consequences to ageing were significantly lower in the former smoker condition (M = 3.76, SD = 0.70) than in the never smoker condition (p = .003). There was no significant difference between the never smoker and current smoker conditions (p = 0.169) or former smoker and current smoker conditions (p = 0.786). Levels of awareness of the negative consequences to ageing were significantly higher in the former smoker condition (M = 2.88, SD = 0.84) compared with the never smoker condition (p = 0.003). However, there was no significant difference between the never smoker and current smoker conditions (p = 0.163) or the former smoker and current smoker conditions (p = 1.000). Significant differences in individual perceptions of control over positive ageing experiences were seen between the never smokers (p = 0.021) and current smokers conditions (M = 3.93, SD = 0.63) with no significant difference between the never smoker and former smoker conditions (p = 0.063) or the former smoker and current smoker conditions (p = 0.641). Significant differences in individual perceptions of control over negative ageing experiences were seen with lower levels of control experienced in the current smoker condition (M = 2.93, SD = 0.82) compared with the never smoker (p < .001) and the former smoker conditions (p < .001). No significant differences were seen between the never smoker and former smoker conditions (p = 0.587). Finally, individual emotional representation of the ageing process was significantly higher both in the former smoker (M = 2.30, SD = 0.77) and in the current smoker conditions (M = 2.41, SD = 0.82) compared with the never smoker condition (p = 0.006 & p <.001 respectively). Significant differences were also seen between those in the former

smoker condition (M = 2.30, SD = 0.77) and those in the current smoker condition (p <.001).

MNLMs were then developed with smoking status in order to examine the independent contributions of measures when entered together. Established covariates were entered on the first step and ageing self-perceptions were entered on the second step. This sequence was adopted in order to determine the contribution of the APQ domains even after controlling for other more traditional covariates. In both of these models never smoker was set as the base outcome. Only those variables that were significantly associated with smoking status as a result of preliminary univariate analyses were considered. The relationships between the known covariates and smoking behaviour is described below and outlined in Model I and Model II (Copy of Table 6.10). As there were no major differences in levels of significance between the known covariates and smoking in either model, only the relative risk ratios for the covariates in Model II are mentioned below.

6.4.7. The relationship of ageing self-perceptions to smoking status

The relationship between ageing self-perceptions and smoking status is described here dealing with each of the study hypotheses in turn. These are outlined in Table 5.13 below. The coefficients from Model II were then used to assess the marginal effects for the probabilities of being a former smoker or a current smoker in relation to the APQ variables (Appendix C: Table A7).

6.4.7.1. Hypothesis 1b: Timeline and smoking status

The hypothesis that higher mean scores on the timeline domains would be related to tobacco consumption was partially supported (hypothesis 1b). No significant differences in the relative risks of being a former smoker or a current smoker over a never smoker were seen between individuals with either a chronic or a less chronic ageing timeline, once other variables in the model were held constant. Neither were there significant differences seen in the relative risks of being a current smoker over a never smoker between individuals who had a stable or unstable cyclical ageing timeline. However, the risk of being a former smoker - relative to a never smoker,

would be expected to increase by a factor of 1.10, once other variables in the model are held constant for those individuals with a strong cyclical ageing timeline. The marginal effects after the MNLM showed that a one unit increase on the timeline acute/chronic scale did not affect the probability of being either a former smoker (y = Pr(former) (predict) = -0.019 (p= 0.072)) or a current smoker (y = Pr(current) (predict) = -0.011 (p= 0.125)). Similarly, a one unit increase on the timeline cyclical scale did not increase the probability of being either a former smoker (y = Pr(former) (predict) = 0.045 (p= 0.228)) or a current smoker (y = Pr(current) (predict) = -0.002 (p= 0.848)). Therefore, former smokers were 10% more likely to perceive increased reminders regarding their experiences of age or ageing when compared with never smokers while no difference in smoking status was observed for those with a chronic awareness of their ageing.

6.4.7.2. Hypothesis 2b: Consequences and smoking status

The hypothesis that higher mean scores on the consequences domains would be related to levels of alcohol consumption was partially supported (hypothesis 2b). No significant differences in the relative risks of being a former smoker or a current smoker over a never smoker were seen between the differing levels of beliefs regarding the positive consequences of ageing. However significant differences in the relative risks of being a former smoker or a current smoker over a never smoker were seen between those who perceived their own ageing as having strong levels of negative ageing consequences, once other variables in the model were held constant. The risk of being a former smoker - relative to a never smoker - for individuals with strong beliefs regarding the negative consequences of ageing, would be expected to decrease by a factor of 0.89, once other variables in the model are held constant. In addition, their risk of being a current smoker relative to a never smoker would be expected to decrease by a factor of 0.80, once other variables in the model are held constant. The marginal effects after the MNLM showed that a one unit increase on the consequences positive scale decreased the probability of being a former smoker by 2.2 percentage points (y = Pr(former) (predict) = -0.022 (p= 0.049)). However a unit increase on the same scale did not affect the probability of being a current smoker (y =

Pr(current) (predict) = 0.008 (p= 0.321)). A one unit increase on the consequences negative scale did not affect the probability of being a former smoker (y = Pr(former) (predict) = -0.013 (p= 0.281)). However a unit increase on the same scale did decrease the probability of being a current smoker by 2.5 percentage points (y = Pr(current) (predict) = -0.025 (p= 0.003)). Therefore individuals with strong beliefs regarding the negative consequences of ageing were 11% less likely to be former smokers and 20% less likely to be current smokers. The post-estimation tests confirmed that participants were less likely to be either former smokers or current smokers if they perceived more negative consequences to age and ageing.

6.4.7.3. Hypothesis 3b: Control and smoking status

The hypothesis that higher mean scores on the control domains would be related to smoking status was partially supported (hypothesis 3b). No significant differences in the relative risks of being a former or current smoker over a never smoker were seen between individuals who perceived varying levels of control over the positive aspects of ageing, once other variables in the model were held constant. Neither were significant differences in the relative risks of being a former smoker over a never smoker seen between individuals who perceived varying levels of control over the negative aspects of ageing, once other variables in the model were held constant. However, the risk of being a current smoker - relative to a never smoker - for individuals who perceived less control over the negative aspects of ageing, would be expected to increase by a factor of 1.13 once other variables in the model are held constant. The marginal effects after the MNLM showed that a one unit increase on the control positive scale did not affect the probability of being either a former smoker (y = Pr(former) (predict) = 0.004 (p= 0.763)) or a current smoker (y = Pr(current) (predict) = -0.010 (p= 0.294)). However, a unit increase on the control negative scale decreased the probability of being a former by 3.0 percentage points. In addition a unit increase on the same scale increased the probability of being a current smoker by 2.1 percentage points. Therefore an individual who perceived less control over negative ageing experiences would be 13% more likely to be a current smoker than a never smoker. The post-estimation tests confirmed that participants were less likely to be

former smokers and more likely to be current smokers if they perceived less control over negative ageing experiences.

6.4.7.4. Hypothesis 4b: Emotional representation and smoking status

The hypothesis that higher mean scores on the emotional representation domain will be related to tobacco consumption was not supported (hypothesis 4b). No significant differences in the relative risks of being either a former or current smoker over a never smoker were seen between individuals who perceived varying degrees of emotion regarding their ageing experience. In addition, the marginal effects after the MNLM showed that a one unit increase on the emotional representation scale did not affect the probability of being either a former smoker (y = Pr(former) (predict) = -0.134 (p= 0.095)) or a current smoker (y = Pr(current) (predict) = 0.010 (p= 0.906)).

Copy of Table 6.10: Multinomial logit models with relative risk ratios for the association of ageing self-perceptions & other covariates with smoking behaviour (n = 6576)

Variables	Model I	Model II
Never smoker	*(omitted)*	*(omitted)*
Former smoker		
Age	1.01 (1.01 - 1.02)***	1.02 (1.01 - 1.03)***
Gender	0.51 (0.45 - 0.58)***	0.48 (0.43 - 0.55)***
Education (vs. Primary)		
Secondary	0.77 (0.66 - 0.89)***	0.75 (0.68 - 0.87)***
Tertiary	0.68 (0.55 - 0.83)***	0.66 (0.54 - 0.82)***
Social class (vs. SC1 - SC2)		
SC3 - SC4	0.92 (0.77 - 1.11)	0.92 (0.77 - 1.11)
SC5 - SC6	1.07 (0.86 - 1.33)	1.07 (0.86 - 1.33)
Farmer	0.43 (0.37 - 0.64)***	0.50 (0.38 - 0.66)***
Unclassified	0.81 (0.69 - 0.96)*	0.82 (0.70 - 0.97)*
Marital status (vs. Married)		
Never married	1.13 (0.93 - 1.39)	1.14 (0.93 - 1.39)
Sep/divorced	1.23 (0.96 - 1.59)	1.22 (0.95 - 1.57)
Widowed	1.07 (0.89 - 1.28)	1.09 (0.90 - 1.31)
Drinking status (vs. Non-drinker)		
Moderate drinker	1.65 (1.43 - 0.90)***	1.62 (1.40 - 1.87)***
Harmful drinker	2.72 (2.31 - 3.20)***	2.67 (2.27 - 3.15)***
Physical Activity (vs. Low)		
Moderate	1.05 (0.91 - 1.20)	1.03 (0.89 - 1.18)
High	1.06 (0.91 - 1.23)	1.04 (0.89 - 1.20)
Self-rated physical health (vs. Excellent)		
Very good	1.19 (1.00 - 1.41)*	1.19 (1.00 - 1.41)*
Good	1.37 (1.16 - 1.63)***	1.39 (1.16 - 1.65)***
Fair	1.78 (1.45 - 2.18)***	1.83 (1.49 - 2.26)***
Poor	2.14 (1.53 - 2.98)***	2.27 (1.62 - 3.18)***
Depressive symptoms (vs. None/mild**)**		
Moderate	1.04 (0.89 - 1.21)	1.02 (0.88 - 1.20)
Severe	1.12 (0.90 - 1.39)	1.07 (0.86 - 1.35)
Ageing self-perceptions		
Timeline acute/chronic		0.94 (0.86 - 1.02)
Timeline cyclical		1.10 (1.00 - 1.21)*
Consequences positive		0.96 (0.88 - 1.05)
Consequences negative		0.89 (0.81 - 0.98)*
Control positive		0.96 (0.87 - 1.07)
Control negative		0.92 (0.85 - 1.00)
Emotional representation		1.11 (0.99 - 1.24)

Contd/…

Copy of Table 6.10: Multinomial logit models with relative risk ratios for the association of ageing self-perceptions & other covariates with smoking behaviour (continued)

Variables	Model I	Model II
Current smoker		
Age	0.96 (0.95 - 0.97)***	0.96 (0.95 - 0.97)***
Gender	0.69 (0.58 - 0.80)***	0.66 (0.56 - 0.78)***
Education (vs. Primary)		
Secondary	0.55 (0.46 - 0.65)***	0.56 (0.46 - 0.67)***
Tertiary	0.25 (0.18 - 0.34)***	0.26 (0.19 - 0.36)***
Social class (vs. SC1 - SC2)		
SC3 - SC4	0.95 (0.74 - 1.22)	0.93 (0.73 - 1.20)
SC5 - SC6	1.57 (1.19 - 2.09)*	1.53 (1.15 - 2.03)*
Farmer	0.51 (0.34 - 0.76)**	0.50 (0.33 - 0.75)**
Unclassified	1.10 (0.88 - 1.38)	1.09 (0.87 - 1.36)
Marital status (vs. Married)		
Never married	1.51 (1.17 - 1.95)**	1.50 (1.16 - 1.94)*
Sep/divorced	2.42 (1.84 - 3.18)***	2.44 (1.86 - 3.21)***
Widowed	1.59 (1.24 - 2.03)***	1.60 (1.25 - 2.04)***
Drinking status (vs. Non-drinker)		
Moderate drinker	1.34 (1.13 - 1.67)**	1.37 (1.13 - 1.67)*
Harmful drinker	2.89 (2.34 - 3.57)***	2.87 (2.32 - 3.55)***
Physical Activity (vs. Low)		
Moderate	0.85 (0.71 - 1.02)	0.85 (0.70 - 1.02)
High	0.94 (0.78 – 1.36)	0.94 (0.78 - 1.14)
Self-rated physical health (vs. Excellent)		
Very good	1.16 (0.91 - 1.47)	1.15 (0.90 - 1.47)
Good	1.45 (1.14 - 1.83)**	1.43 (1.13 - 1.82)*
Fair	2.19 (1.67 - 2.86)***	2.17 (1.65 - 2.85)***
Poor	2.47 (1.66 - 3.69)**	2.51 (1.67 - 3.77)***
Depressive symptoms (vs. None/mild**)**		
Moderate	1.22 (1.01 - 1.49)*	1.19 (0.98 - 1.46)
Severe	1.61 (1.26 - 2.07)***	1.52 (1.17 - 1.96)*
Ageing self-perceptions		
Timeline acute/chronic		1.05 (0.94 - 1.18)
Timeline cyclical		1.06 (0.93 - 1.21)
Consequences positive		0.98 (0.88 - 1.11)
Consequences negative		0.80 (0.70 - 0.91)**
Control positive		0.94 (0.82 - 1.08)
Control negative		1.13 (1.01 - 1.27)*
Emotional representation		1.17 (0.97 - 1.29)

* p<0.05, ** p<0.01, *** p<0.001

Note: Base outcome = Non-drinker

RRR = Relative risk ratios (95% Confidence Interval)

6.4.8. The inter-relationship between ageing self-perceptions and the health behaviours

The strength of the relationship between ageing self-perceptions and the health behaviours was examined using multivariate analyses of covariance (MANCOVA). The hypotheses tested whether or not there would be a relationship between the seven APQ domains and health behaviour status. Initially, the differences in ageing self-perceptions by drinking and smoking status and the combined health behaviours were assessed in the first MANCOVA. After excluding the two timeline domains as non-significant, a follow up MANCOVA examined the association between the remaining APQ domains to drinking and smoking status and the combined health behaviours, while controlling for established covariates of the two health behaviours. The first model showed that ageing self-perceptions had a significant effect on the combined health behaviours (Wilks F, 9.96; $p < 0.001$) and this effect remained when established covariates were added (Wilks F, 26.39; $p< 0.001$). To establish the contribution of the seven APQ domains to the combined health behaviours, a multivariate regression (mvreg) was run after each of the MANCOVAs to obtain the coefficients and standard errors for each of the APQ predictors in the models. These results are outlined in Table 6.14 with the rest of the models reported in Appendix C: Table A8.

6.4.8.1. Hypothesis 1c: Timeline and the interrelationship between the health behaviours

The hypothesis that the relationship between the two timeline domains and the health behaviours would be stronger when the behaviours were inter-related was not supported (hypothesis 1c). There was no significant association between the mean scores for either timeline acute/chronic or timeline cyclical on drinking and smoking status combined. Therefore individual levels of cognitive dissonance regarding the temporal aspects of ageing did not influence their combined health behaviours.

6.4.8.2. Hypothesis 2c: Consequences and the interrelationship between the health behaviours

The hypothesis that the relationship between the two consequences domains and the health behaviours would be stronger when the behaviours were inter-related was

supported (hypothesis 2c). The results indicated there was a statistically significant interaction between the two consequences domains and the combined health behaviours. A change in the mean values for consequences positive was associated with a -0.135 unit change in the combined health behaviours. In other words, as individuals perceptions regarding the positive aspects of ageing became more negative, their combined health behaviour score was expected to decrease by 0.135 units and this finding was independent of the established covariates of the two health behaviours. Similarly, a change in the predicted value of consequences negative was associated with a -0.121 unit change in the combined health behaviours. In other words, as individuals' beliefs regarding the negative aspects of ageing became more negative, their combined health behaviour score was expected to decrease by 0.121 units and this finding was independent of the established covariates of the two health behaviours.

6.4.8.3. Hypothesis 3c: Control and the interrelationship between the health behaviours

The hypothesis that the relationship between the two control domains and the health behaviours would be stronger when the behaviours were inter-related was not supported (hypothesis 3c). There was no significant association between the mean scores for either timeline acute/chronic or timeline cyclical on drinking and smoking status combined. Therefore individual levels of control over either the positive or negative aspects of ageing did not influence their combined health behaviours.

6.4.8.4. Hypothesis 4c: Emotional representation and interrelationship between the health behaviours

The hypothesis that beliefs on the emotional representation domain would be stronger when there was an inter-relationship between the two health behaviours was supported (hypothesis 4c). A change in the mean values for emotional representation was associated with a 0.128 unit change in the combined health behaviours. In other words, the more intense an individuals' emotional responses to ageing was, their combined health behaviour score was expected to increase by 0.128 units and this finding was independent of the established covariates of the two health behaviours.

Table 6.14: mvreg following MANCOVA for the inter-relationship between drinking and smoking and ageing self-perceptions to drinking and smoking status (n – 6576)

Drinking*Smoking	Model I β / standard error	Model II β / standard error
Timeline acute/chronic	0.076	
	(1.85)	
Timeline cyclical	0.044	
	(0.93)	
Consequences positive	-0.117	-0.135
	(2.73)**	(3.23)**
Consequences negative	-0.177	-0.121
	(3.86)**	(2.61)**
Control Positive	0.038	0.056
	(0.73)	(1.12)
Control negative	-0.093	-0.044
	(2.25)*	(1.07)
Emotional representation	0.218	0.128
	(4.21)**	(2.48)*
Age		-0.056
		(16.10)**
Sex		-0.844
		(14.86)**
Marital status		0.115
		(4.34)**
Social class		-0.058
		(3.33)**
Education		-0.206
		(4.43)**
Self-rated health		0.092
		(3.37)**
Depression		0.121
		(2.63)**
Physical Activity		-0.036
		(1.05)

* p<0.05, ** p<0.01, *** p<0.001
Note: mvreg = multivariate regression

6.4.9. Summary of key results

In total, 3006 men and 3570 women were eligible to take part in the study representing a response rate of 85%. There were significant differences between men and women on all socio-demographic characteristics and reported levels of depression but no significant differences were seen in their levels of self-rated health.

With regard to drinking, on average, both men and women stayed within recommended daily limits of 4 units on a drinking occasion for men and 3 units for women. A higher proportion of women than men were non-drinkers, and harmful

drinkers tended to be male. The highest proportion of non-drinkers was among the oldest age group with more harmful drinkers found in the youngest age group. Non-drinkers were also less likely to be current smokers whereas a high proportion of harmful drinkers were also current smokers. With regard to marital status, more non-drinkers were seen among those who were widowed whereas more harmful drinkers were found in the separated/divorced category.

With regard to smoking, participants who smoked reported that they smoked between one and over sixty cigarettes per day with the highest percentage of them smoking between 20-39 cigarettes per day. One in five older Irish adults is a current smoker. While overall the prevalence of smoking was the same in both men and women, higher rates of smoking were reported in the youngest age group and in adults with primary education. Women were more likely to have never smoked, whereas men are more likely to be former smokers. With regard to marital status, more never smokers were seen among those who were married whereas more current smokers were found in the separated/divorced category.

Overall, this study found that the explanatory power of individual ageing self-perceptions of the two health behaviours was weak in comparison to the explanatory power of many of the established covariates of these behaviours, particularly when the behaviours were examined independently. However, when the behaviours were examined jointly, the explanatory power of two of the APQ domains was stronger than that of the established covariates.

The investigation of the relationship between the APQ domains and drinking status suggested that two ageing self-perceptions may play a role in the alcohol consumption of older adults. Preliminary univariate analyses showed that the relationship between three of the seven domains on the APQ was not significant at the $p<.05$ level with drinking status. The three domains were timeline cyclical, consequences positive and emotional representation. Therefore as these three domains were omitted from further analyses, the contribution of each of the individual remaining domains of the ageing experience to drinking status was then examined in a MNLM. Significant explanatory variables were timeline acute/chronic, control positive and control

negative. The relative risk ratios indicated that a chronic awareness of age and ageing and beliefs about control over both positive and negative ageing experiences were associated with drinking status.

With regard to the investigation of the relationship of the APQ domains to smoking behaviour, the results indicated that three ageing self-perceptions may play a role in the tobacco consumption of older adults. While preliminary univariate analyses indicated a significant relationship between all seven domains on the APQ, in the subsequent MNLM only three significant explanatory variables remained. These were timeline cyclical, consequences negative and control negative. The relative risk ratios indicate that a lack of stability in the individual's experience of ageing, having a negative outlook, and negative beliefs about control over ageing experiences were associated with smoking status. In this study, former smokers were more likely to perceive increased reminders regarding their experiences; they were more likely to be current smokers if they perceived negative consequences to the ageing process or if they perceived less control over negative ageing experiences.

The investigation into the strength of the relationship of the APQ domains to the interaction between the two health behaviours indicated that three ageing self-perceptions played a stronger role when there is an interrelationship between the health behaviours over and above that of the established covariates. There was a stronger association with perceived levels of pessimism regarding the positive consequences of ageing as well as a strong emotional response to the process with the levels of interaction between the combined health behaviours. In addition, increased levels of rejection of the negative consequences associated with ageing also had an effect on the combined health behaviours. The implications regarding these key results as well as other findings will be discussed in detail in the next chapter.

Chapter 7. Discussion

7.1. Introduction

The aim of this study was to assess the prevalence of risky health behaviours and to examine how individual ageing self-perceptions interact with health behaviours into old age. The study used a multidimensional framework to explore how an individual's outlook and subjective beliefs about growing old influence their drinking and smoking behaviours later in life. This chapter discusses the study findings in turn, their implications and possible directions for future research. The study strengths and limitations will also be discussed.

7.2. Study findings

7.2.1. Significance of ageing self-perceptions

This study examined the association between the cognitive and emotional dimensions of individual ageing experiences, with regard to age and gender differences, controlling for other socio-demographic characteristics (education, social class and marital status). With regard to age differences, the overall results indicated that older participants were more aware of themselves as ageing and the negative consequences associated with the process. Moreover, they reported some loss of control over their ability to influence those consequences. While the oldest members of the population reported the strongest emotional response to ageing, their responses remained on the positive end of the subscale, indicating that they did not have serious issues of fear or loss associated with the ageing process.

Overall, TILDAs' participants expressed positive views regarding the ageing process in that they acknowledged more positive aspects to ageing than negative aspects. However, the oldest age group perceived their ability to cope with ageing more negatively. Given the assumption that ageing as a process is defined by the inevitable decline of the mind and body (Levy, 2009), this finding that the process of reaching the

later years of life was not viewed in a positive manner was not a surprising one. However the variability of ageing beliefs at an individual level indicated that older Irish adults were not uniformly prepared to incorporate negative cultural norms regarding ageing into their ageing self-perceptions.

With regard to gender differences, women reported more positive beliefs about ageing than men. They were more cyclically aware of their ageing compared with men who were more chronically conscious of it. Women also perceived more positive consequences to the ageing process and were also more positive about the negative consequences associated with ageing. Finally, they perceived more control over both the positive and the negative aspects of ageing.

This was a surprising finding as the dominant discourse around ageing is seen as particularly negative towards women (Dionigi, Horton & Bellamy, 2011). Women are considered to age at a faster rate than men and they are encouraged from an early age to place a high value on physical appearance, positioning old age as something not to be desired (McConatha, Hayta, Rieser-Danner, McConatha & Polat, 2004). However, women did report some concerns regarding the ageing process. On the emotional representation subscale, they perceived more negative emotional responses that included concerns about fear and loss associated with the ageing process in comparison to men. Nonetheless, men appeared to hold more negative belief about the ageing process than previous research has identified. These findings highlight the complexity of the ageing process and how it is experienced both at an individual level and at a societal level. It also suggests that ageing self-perceptions is a multi-dimensional concept and as such needs to be studied multi-dimensionally. The next sections will discuss the prevalence of the two health behaviours in this community dwelling population and will then go on to discuss the findings outlining the relationship of ageing self-perceptions to drinking and smoking behaviours.

7.2.2. Prevalence of alcohol consumption

In this sample one third of older drinkers were at risk either because of drinking to excess in a single drinking episode or because they exceeded the weekly drinking

limits. Consistent with past literature, the highest proportion of non-drinkers was among the oldest age group (75+) with more harmful drinkers found in the youngest age group (Barnes *et al.*, 2010, Immonen *et al.*, 2011, Molander *et al.*, 2010, Morgan *et al.*, 2009, Platt *et al.*, 2010). Also consistent with previous research, women were more likely to be non-drinkers while men displayed significantly higher alcohol use patterns both for moderate and harmful drinking levels (Bobrova *et al.*, 2010, Immonen *et al.*, 2011, Kim, 2012, Menon *et al.*, 2010, Molander *et al.*, 2010). Higher levels of education and higher social class were more strongly associated both with moderate and harmful drinking. This finding is consistent with studies that have shown a strong relationship between higher educational attainment and higher social class and levels of alcohol consumption over time (Immonen *et al.*, 2011, Platt *et al.*, 2010) and contradicts the notion that lower levels of educational attainment as well as lower social class are more predictive of harmful drinking (Molander *et al.*, 2010, Sacco *et al.*, 2009).

The correlates of not drinking in this study were also health related, where poorer self-rated health was associated with not drinking. As the variable drinking history was not obtained in the TILDA survey, it was difficult to ascertain if participants were lifelong abstainers or stopped because of adverse health events. This would support longitudinal evidence that poor health resulting from adverse health events lead to reduced alcohol intake (Brennan *et al.*, 2010). On the other hand, harmful drinking was strongly associated with being a current smoker, supporting recent research findings that harmful drinkers are more likely to be current smokers (Hajat *et al.*, 2004) and putting participants at increased risk of adverse health events. Previous researchers have noted that women who are harmful drinkers and smokers are less likely to engage in physical activity (Moore *et al.*, 2001). However, in this study while no association was observed between harmful drinking and physical activity, moderate drinking was associated with an increased likelihood of engaging in moderate levels of physical activity.

7.2.3. Prevalence of smoking

One in six older Irish adults stated that they were current smokers. The finding that the overall prevalence of smoking in this study was the same for both men and women (17%) contradicts findings from other OECD countries (OECD, 2013) and SLÁN 2007 (Brugha *et al.*, 2009) where smoking prevalence was higher for men than for women. However this study's decreasing trend in smoking prevalence associated with age, for both men and women, has also been noted in other studies, with fewer current smokers found among older members of the population (Brugha *et al.*, 2009, Burns *et al.*, 1997, Drum *et al.*, 2009, Kim *et al.*, 2007).

Consistent with previous studies, education, marital status and social class were associated with smoking behaviour (van Loon *et al.*, 2005, Zheng *et al.*, 2008). Higher rates of current smokers were reported in adults with a primary education or in the lower social class groups (SC5-SC6 & unclassified). With regard to marital status, more never smokers were seen among those who were married whereas more current smokers were found in the separated/divorced category, with those in the never married or widowed categories having a higher risk of remaining in the current smoker category.

In this study, former smokers were most likely to rate their own health as fair or poor. This finding is supported by previous research findings that having a poor self-rated health status increases the rate of quit attempts (Lin, 2010). Participants in TILDA who reported severe levels of depression and poor self-rated health had an increased lilkelihood of being current smokers. In the SLÁN surveys, mental health was identified as an obstacle to quitting, with current smokers being 2-3 times more likely to report psychological distress (Brugha *et al.*, 2009). How the above findings relate to individual beliefs regarding their own ageing will be discussed in detail next.

7.2.4. Ageing self-perceptions and the health behaviours

A key aim of this part of the study was to investigate the relationship of ageing self-perceptions to drinking and smoking behaviours using Barker's SRM. This was done by investigating how each of the seven APQ domains influenced individual drinking and

smoking patterns after controlling for all other established covariates outlined above. Four hypotheses, each with three levels, were asserted and were analysed using univariate and multivariate analyses. These are outlined below and the findings will be discussed in detail next.

7.2.4.1. Hypothesis 1: Timeline and the health behaviours

In this study, older participants (75+) were more aware of ageing, were increasingly more preoccupied by it and held more negative beliefs regarding their ageing experience. Although experiencing variation in the number of reminders regarding age or ageing did not affect drinking status, a preoccupation with it had a negative impact, putting the youngest age group (50-64) in particular at a higher risk for harmful drinking. As such, these participants feel their age in everything they do and perceive constant reminders of their age and their ageing. Using the SRM framework, it might be considered that this particular group used alcohol to cope with these reminders and that this negative self-image was alleviated by their over-indulgence in alcohol. The present findings are consistent with the notion that not being able to distance oneself from ageist stereotypes and identifying with the label "old" may cause the individual to be preoccupied with the ageing process and to foster a negative self-image (Weiss & Lang, 2012). These self-referent beliefs about how the individual perceives the impact of ageing on their life can affect how they adapt (Kirkevold *et al.*, 2012, Levy *et al.*, 2009, Steverink *et al.*, 2001).

With regard to smoking, level of preoccupation with the ageing experience was not associated with smoking status. However, increased reminders of ageing were associated with an increased likelihood of being a former smoker. While one possible explanation for this finding is that these participants discontinued smoking because they were experiencing deterioration in their physical health, another possibility is that despite the increased reminders, they were able to make plans for the future in spite of the increased reminders about getting older. This appears to contradict the Nilsson *et al* (2000) findings that preoccupation with the ageing process leads to feelings of powerlessness, anxiety and fear in relation to ageing. However these participants were subject only to cyclical - albeit increased - reminders of their ageing. Therefore, it

might be argued that the levels of instability or lack of continuity in their ageing experience were not severe enough that they felt powerless to act against the damaging effects of smoking. Using the SRM to explain this outcome, it is possible that as old age is often equated with deterioration, these participants made the decision to stop smoking in order to reduce the reminders of their age and ageing and to lessen their fears of increased disability associated with smoking.

In examining how the two health behaviours interacted with the timeline domains, it would seem that varying levels of chronic or cyclical awareness of one's own ageing was not associated with these combined behaviours. How the individual perceives the temporal aspects of their own ageing experience will determine their ability to accept or reject negative ageist stereotypes and thus to modify their health behaviours to promote a positive conception of themselves (Kaufman *et al.*, 2002). In this study, while a chronic awareness of ageing was associated with harmful drinking, a chronic awareness of ageing was not associated with smoking. In addition, individuals who perceived increased reminders of their own ageing, whereby they go through cycles of feeling old, were more likely to discontinue smoking, while varying levels of cyclical awareness of ageing was not associated with drinking status. Overall, as participants in this study were less chronically aware of their ageing and reported more stability in their ageing experience, they may have had more positive expectations for the future with regard to their own ageing and were therefore less likely to engage in multiple harmful behaviours.

Nonetheless, the issue of how time is cognitively appraised in the ageing experience is important as individuals with a chronic awareness of their own age or who identify strongly with old age might be more likely to see their time as limited which in turn might have implications for the goals or strategies that they adopt for regulating challenges (Benton *et al.*, 2007). In this way, the distinction between being old and feeling old is central to facilitating good psychological adjustment to the ageing process. Changing one's health behaviour is a difficult self-regulation process in itself. When that is compounded with a negative conception of one's ageing self, and a view of one's ageing as a process of irreversible decline, the risks attributed to harmful

behaviours may be underestimated as the conditions associated with alcohol consumption or smoking may be linked to ageing rather than the behaviour itself (Kotter-Grühn *et al.*, 2011).

7.2.4.2. Hypothesis 2: Consequences and the health behaviours

The hypothesis that stronger beliefs on the consequences domains, that include a sense of growth and appreciation or a loss of independence, depending on the consequences positive and negative domains respectively, would be related to levels of alcohol consumption was not supported. This was a surprising finding as TILDA's participants saw more advantages than disadvantages to growing old. The findings contradict earlier studies in which individuals with a better outlook regarding the ageing process demonstrated better self-care behaviour compared to those with a negative outlook (Levy, 2003); studies indicating that individuals who perceived fewer negative ageing consequences practiced more preventive health behaviours (Levy *et al.*, 2004, O'Reilly *et al.*, 2003); and one further study which noted that a negative outlook regarding ageing may have led individuals to use alcohol as a way of coping or escaping from the frustrations of growing old (Lai, 2004).

A possible explanation for the lack of association between drinking status and ageing consequences is that participants had no conception of what constitutes harmful drinking and were therefore less likely to see alcohol as a way of coping with the frustrations of growing old as postulated by Lai. This was borne out In the SLÁN 2007 survey where the authors noted that an overwhelming majority of middle-aged and older harmful drinkers were not aware that their drinking may have harmed their health in the previous 12 months of the survey nor did they have a clear understanding regarding safe drinking limits (Morgan *et al.*, 2009). Another possible explanation is that participant's simply did not perceive any ageing consequences associated with their drinking behaviour. This may be due to the fact that from a public health point of view, alcohol is treated as a 'newer' problem than smoking and recent public campaigns to address harmful drinking have been targeted at younger members of society. Thus, it is possible that older adults did not see their drinking behaviour as

problematic as it may not yet have affected their lives and therefore it had no effect on individual adaptation strategies.

There was more evidence that an individual's outlook regarding the ageing process was associated with smoking behaviours but the findings were mixed with regard to support for previous research. Participants who perceived advantages to age and ageing were more likely to be former smokers. This supports the Levy (2003) study that a positive outlook would be associated with better self-care such as quitting smoking to enhance their ageing experience (Levy, 2003). This is also supported by the SRM framework that negative ageing consequences and variation in one's experience of age and ageing would be associated with poor goal setting such as changing patterns of drinking or smoking to compensate for other perceived losses (Barker *et al.*, 2007).

Surprisingly, this study also noted that individuals with strong beliefs regarding the negative consequences of ageing (dependency and loss of ability) were more likely to be never smokers; this is contrary to the findings of the other studies outlined above as instead of compensating for impending losses with more risky behaviours, participants behaviour was instead more cautionary. Another possible explanation is that they have reached an understanding regarding the harmful effects of smoking which has been shown to increase the rate of quit attempts (Lin, 2010, Sachs-Ericsson *et al.*, 2009). These participants who associated ageing with a heightened risk of decline and may be consumed by fears regarding loss and independence may therefore be less likely to engage in a health damaging behaviour that might exacerbate their concerns.

In considering the interrelationship between the health behaviours and ageing consequences, it was observed in this cross-sectional study that participants who perceived stronger variation in their beliefs about both the positive and negative aspects of ageing were more likely to reduce their level of engagement in their combined risky health behaviours. This finding is not supported by previous research. For example, one study that examined ageing self-perceptions in relation to two or more health behaviours found that it was a positive outlook on ageing that caused

individuals to practice more preventive health behaviours over time (Levy *et al.*, 2004). Levy (2003) also observed that older adults who have been subjected to negative depictions of the consequences of ageing sometimes act with detrimental effects to their well-being and health. This contradictory finding might suggest that when older individuals perceive their ageing outcomes in a negative way they are more likely to take stock of their behaviours and adapt them to reduce their levels of fear regarding the negative consequences associated with ageing.

7.2.4.3. Hypothesis 3: Control and the health behaviours

Within the self-regulation model, sense of control is conceptualised as being domain-specific within positive and negative sets of beliefs that include feelings of control over one's own level of independence or feelings of a loss of control over one's own destiny. In this study a sense of control over the positive aspects of ageing was associated with moderate and harmful drinking behaviour. The finding regarding the moderate use of alcohol in the context of positive control is encouraging. Individuals who feel in control of their ageing experience were more likely to engage in activities that might make that experience a more positive one. Research has identified several psychosocial benefits associated with moderate alcohol consumption. Engaging within a social context, such as drinking with friends, can be a positive ageing experience. For instance, it can be a chance to break a cycle of isolation (Ferreira et al., 2008), and be beneficial in terms of survival and mental health-related quality of life (Byles et al., 2006). Indeed adapting a healthier lifestyle that includes moderate alcohol consumption has also been associated with improved quality of life in older adults (Conry et al., 2011).

However, a worrying finding was that harmful drinking was also associated with perceived levels of control over the positive aspects of ageing. This supports the earlier finding that older adults do not associate drinking with ageing consequences. Despite feelings of control over their ageing experience, individuals who engaged in harmful drinking either did not perceive it as such, did not envisage any poor outcomes associated with it, or were under the misconception that their behaviour would have positive health outcomes. Indeed it has been demonstrated that attitudes to drinking

play a role in moderating the relationship between ageing and drinking patterns (Bacharach *et al*., 2008). Individuals who hold positive expectations about the role that alcohol plays in sustaining their moods and emotions are more likely to report harmful drinking compared with those with negative alcohol expectancies.

In this study there was evidence that in the context of ageing, individuals who endorsed beliefs regarding control over negative ageing aspects were more likely to modify/regulate their drinking behaviour to prevent undesired intra-personal outcomes. The findings support the notion that maintaining an expectancy of personal control is important to buffer older adults' ageing perceptions against the effects of perceived losses (Sargent-Cox *et al.*, 2012a). Differences in the adaptive value of control appear to depend on the individual's position in the lifecycle (Bailis *et al.*, 2002). With increasing years, decreasing physical health and the onset of chronic diseases, control over these very negative aspects of ageing would be adaptive in this phase of life.

A surprising finding for this study was that smoking status was not associated with varying levels of control over the positive aspects of ageing. Neither was there an association between being a former smoker over a never smoker and varying levels of control over the negative aspects of ageing. It is possible that worry was a stronger factor both for smoking initiation and smoking cessation, whereby concerns about health took precedence over control, or that knowledge regarding the harmful effects of smoking were a stronger predictor of smoking initiation or quitting attempts (Dijkstra *et al.*, 2003, Lin, 2010, Sachs-Ericsson *et al.*, 2009). However, negative or varying perceptions of control were associated with current smoking behaviour whereby individuals who perceived less control over negative ageing aspects were more likely to be current smokers. The SLÁN 2007 survey and other studies have noted that older smokers made fewer quitting attempts than younger smokers, putting them at a higher risk of dying from smoking related diseases (Brugha *et al.*, 2009, Burns, 2000, Donze *et al.*, 2007). This finding might be explained by the Kerr *et al* study which showed that former smokers and current smokers with low levels of

control were more likely to relapse or less likely to make a quitting attempt even when they reported strong concerns about the negative effects of smoking.

In examining how the two health behaviours interacted with the control domains, it would seem that varying levels of control over either the positive or negative aspects of ageing was not associated with the combined behaviours. While older age in the present study was associated with a loss of perceived control over both the positive and negative aspects of ageing, both for harmful drinking and smoking on their own, when the behaviours were combined, no effect was evident. This is contrary to previous research findings that losing control over the different aspects of ageing can cause the individual to become less psychologically resilient as they begin to fear the loss of their own autonomy. Individuals who are not psychologically resilient and have poor beliefs or expectations about how they might adapt to successfully manage their ageing experience are less likely to adapt their environment to improve their own health (Angel *et al.*, 2009, Bell *et al.*, 2002). According to Levy *et al*, this effect arises as a result of a cognitive dissonance regarding the efficacy of engaging in preventive health behaviours or indeed the efficacy of stopping the risky behaviour (Kerr *et al.*, 2004). In SRM terms, this contrary finding might be interpreted as an adaptive strategy whereby fears regarding loss of control over independence and fears over social isolation meant that these participants did not view these risky behaviours as a coping strategy to lower their levels of concerns.

7.2.4.4. Hypothesis 4: Emotional representation and the health behaviours

The hypothesis that negative beliefs on the emotional representation domain will be related to alcohol and tobacco consumption and that this relationship would be stronger when there was an interaction between the two behaviours was partially supported. This study cohort did not have strong emotional responses to ageing, instead their lack of fear and anxiety regarding the ageing process was evident. The relationship between emotions associated with ageing and the health behaviours has not been well studied. McKeen *et al* (2004) defined the negative emotional responses to the ageing process as fear, worry, depression, or anxiety. Therefore, given the association between harmful drinking and mood disorders, one would expect that a

strong emotional response to ageing would be related to drinking and smoking status, but this was not the case. Other studies in this field have shown that negative emotional states are positively related to alcohol consumption but that this effect is strongest when it is associated with harmful drinking (Blazer *et al.*, 2002, Blow *et al.*, 2000, Sacco *et al.*, 2009). Once again, this finding was not supported by this study for those individuals who reported negative emotional responses to ageing or severe levels of depression. However, while a strong emotional response to ageing was not associated with smoking status, reporting severe levels of depression were linked with being a current smoker. In SLÁN 2007 current smokers were also 2-3 times more likely to report psychological distress or to suffer from a generalised anxiety disorder (Brugha *et al.*, 2009).

Nonetheless, in considering the association between emotional representation and the combined health behaviours, it was observed in this study that as an individual's emotional responses to ageing became more negative, they were more likely to increase their levels of engagement in risky health behaviours. Individuals who fear the ageing process display a lack of motivation to change the impact that ageing would have on their lives (Smith *et al.*, 2002). Cross-sectional and longitudinal studies have also demonstrated how a negative response to ageing can negatively affect individual behaviours and long-term health (Levy *et al.*, 2004, Levy *et al.*, 2002a, Wurm *et al.*, 2007). In SRM terms, although it would seem that individual emotional responses to ageing, be they positive or negative, did not play a role in shaping the individual health behaviours, but levels of engagement in the combined behaviours were influenced by levels of fear and anxiety that this cohort perceived regarding the ageing process. In this case it is possible that smoking and drinking combined may be seen as this cohort's way of alleviating their heightened emotional responses to ageing. However, although emotional responses such as fear, anger, and sadness have been identified as salient in relation to health losses, not enough is known about the role that emotional responses play in adaptive outcomes or the impact that they might have on health behaviour practices across the life-span.

7.2.5. Study implications

This study presented evidence that an individual's positive or negative beliefs about ageing was associated with their health behaviours and that this relationship was stronger when there was an interrelationship between the health behaviours on two of the APQ domains. In this study, ageing self-perceptions that involved being constantly aware of getting old (timeline acute/chronic) and not being able to distance oneself from ageist stereotypes (thus fostering a negative self-image) was associated with how older adults regulate their health behaviours. Faced with a negative conception of one's ageing self, and a view of one's ageing as a process of irreversible decline, was associated with an increased likelihood of engaging in harmful drinking. On the other hand, not being constantly aware of one's own ageing was associated with smoking cessation, as was having a positive outlook regarding the ageing process. While drinking status was not associated with levels of perceived control over the positive aspects of ageing, individuals who perceived that they were in control over negative ageing experiences showed a degree of psychological resilience over and above those who perceived little control over their negative ageing experiences by regulating their drinking behaviour to prevent undesired intra-personal outcomes. Participants who reported feelings of depression, worry and anger regarding the ageing process demonstrated maladaptive outcomes and they engaged in higher levels of risky health behaviours to cope with the these difficult feelings.

Some notable findings were also evident that appear to contradict previous research findings and each of them are linked to beliefs regarding ageing consequences. Individuals who perceived strong beliefs regarding the negative consequences of ageing were more likely to be never smokers despite evidence to suggest that such beliefs lead to negative adaptive outcomes. Additionally, when perceptions on the consequences domains were more negative and there was an interrelationship between the health behaviours, participants reduced rather than increased their levels of engagement in the risky health behaviours, again despite the evidence to suggest that such beliefs lead to more negative adaptive outcomes.

The implications arising out of these findings are important as negative ageing self-perceptions may be amenable to change (Bardach, 2010) and favourable ageing perceptions are uniquely associated with lower mortality (Levy, 2005). Interventions aimed at targeting negative ageing beliefs and promoting positive ageing beliefs may provide the motivation for older adults to move from harmful drinking levels to lower risk levels and from being a current smoker to a former smoker. It may also provide the impetus needed to maintain current low risk health behaviours or to engage in other health behaviours into old age. However, before such interventions are made, there is a need to gain a better understanding of why some negative beliefs are associated with positive adaptive outcome strategies and positive beliefs are associated with negative adaptive outcome strategies.

Finally, the absence of a relationship between ageing consequences and alcohol consumption and the presence of a relationship between harmful drinking and perceived levels of control over the positive aspects of ageing is worthy of note. The lack of association between drinking status and ageing consequences suggests that older Irish adults may not have a conception of what constitutes harmful drinking or hold false beliefs about their alcohol intake. Even if they are in good health currently, harmful drinkers may be unaware of the long-term implications of their drinking behaviour. This possibility was supported by the evidence that those who reported positive beliefs regarding their levels of control over their ageing experience, were also more likely to report harmful drinking behaviour. This has implications for policy makers as it is a public health concern. To address this, a targeted alcohol awareness campaign, aimed specifically at older adults, is required to highlight the dangers of harmful drinking in this vulnerable population.

7.2.6. Study strengths and limitations

This study was the first to apply the self-regulation model in the context of ageing self-perceptions to assess the relationship of cognitive and emotional representations of ageing to alcohol and tobacco consumption in an Irish population, and therefore extends current literature. The prevalence of harmful behaviours and how they relate to an individual's assessment of their own ageing is important. This current study can

be considered a useful baseline assessment of this problem and provides a basis for future work that may seek to develop more sophisticated models of ageing adaptation in relation to these and other possible health behaviours.

A further strength of this study is the large random national sample (over 5,000) and the wide age band included (age 50+) – a relatively untypical spread in studies on ageing perceptions. Much of the previous research on successful ageing has concentrated on populations aged 65 years and over, while this study has examined this question in relation to adults aged 50 years and older.

With regard to the TILDA survey instrument, selection bias was largely avoided as it was a national population study. Another major strength of the TILDA survey is that the randomly selected sample maximises the diversity of this population and as such supports the external validity of the study. However, a potential limitation is that the survey focused on community dwelling older adults and a consequence of this was that the survey excluded nursing home residents and those resident in other institutions. While future waves of TILDA intend to continue to review existent participants as they move from home to nursing homes or other residential settings, the exclusion of long-stay residents from this survey has led to an under-representation of the frailer older population in the Wave I data.

Some other potential limitations to the present study should also be noted. The range of missing items in the views about ageing on the APQ was high. While 85% of the 8,504 TILDA participants returned their SCQ (which included the APQ), the completion rates for the APQ section were lower overall, with just 68% of participants completing every item on the APQ. While 51% of the missing data in this study occurred because of non-responses to random items on the APQ, 49% of it is accounted for by failure to return the SCQ. This latter group were excluded from any further analyses as their level of missing data exceed the maximum number of missing items set down on the protocol for missing data adopted by Barker *et al* (2007).

While there are a number of possible reasons why participants did not complete any or all of the items on the APQ, their absence presented concerns regarding the external validity of the study as it was clear that it may have been difficult to generalise the

results to an Irish population (Tabachnick *et al.*, 2007). In determining some possible reasons why the data was missing an overall pattern appeared. Those who failed to complete the APQ items were among the oldest members of the population, those with the lowest level of education or those in the lowest social class category. This finding was not unexpected as issues regarding frailty or literacy may go some way to explaining the incomplete measure. Another expected finding was that individuals who are not currently married or who were current smokers were less likely to complete the measure. Research has shown that current smokers who are widowed or divorced are more likely to be women (Zheng *et al.*, 2008). In this study the majority of non-responders were women or they were not currently married either because they were widowed, separated/divorced or single. Moreover the majority of women who took part in the survey were in the lowest education or in the lowest social class categories and they also consumed the lowest levels of alcohol. In addition, women also reported a stronger negative emotional response to the ageing process which might have impacted on their willingness to complete the questionnaire. The APQ measure itself might account for some of the incompleteness in this case. Perhaps some of the statements on the questionnaire were difficult to interpret and those who were poorly educated might have opted to ignore those questions rather than misinterpret them. In addition, survey fatigue might also account for the low response rates; TILDA's participants had already completed lengthy face-to-face interviews and were then asked to voluntarily complete and return the SCQ which included the APQ as the last questionnaire in the book of 26 other questionnaires.

However, the loss of these participants might have led to a biased representation of the health behaviours and also to a biased representation of the different cognitions and emotions associated with ageing. These differences would have depended on the nature of the relationship of the socio-demographic variables to the health behaviours and the different ageing beliefs. On this basis, the decision to impute the missing APQ data was taken resulting in a response rate of 81% compared with 68% before imputation. Following the concerns raised by Tabachnick & Fidell (2007) that

imputation may reduce variability, artificially increase R^2 and reduce standard errors, their recommendation that analyses be carried out with and without the missing data was implemented in this study and those concerns were unsubstantiated (these results are too dense to publish here, but are available on request).

Additionally, the extent to which conclusions can be drawn are limited by the cross-sectional nature of this study. For instance, although the age patterns for the APQ domains are linear, one cannot interpret them as evidence of a decline or increase with age. Indeed such age-group differences in cross-sectional data may confound cohort and other age-specific sampling effects, thus restricting statements about age-related changes. In addition, the cross-sectional nature of the data also limits the ability to determine causal relationships of ageing self-peceptions to smoking and alcohol consumption. However, as a baseline study of the prevalence of harmful behaviours and how they relate to ageing self-perceptions, this study design was appropriate, but longitudinal data will determine if a causal relationship can be established.

Finally, another limitation to the study, which was alluded to earlier, is with regard to use of self-reported measures to assess alcohol and tobacco consumption. Most of the studies assessed for this review used self-reporting methods. Nonetheless, very little research has been carried out to assess the measures used to reconstruct salient lifetime health behaviours such as tobacco use.

Despite this, epidemiologic research on tobacco use often relies on self-report sometimes with, but often without biologic verification (Brigham, Lessov-Schlaggar, Javitz, Krasnow, Tildesley, Andrews, Hops, Cornelius, Day, McElroy & Swan, 2010). The use of biologic verification to validate self-report measures was examined in an Australian study (McDonald, Maguire & Hoy, 2003). The authors found only a weak correlation between the biomarker (urinary marker) of nicotine exposure and the reported number of cigarettes smoked; indicating that self-report was an adequate measure of tobacco use in their population. Similarly in Canada, self-report provided an accurate estimate of the prevalence of tobacco use when compared with estimates of use based on the presence of urinary cotinine concentration (Wong, Shields,

Leatherdale, Malaison & Hammond, 2012). However, according to the International Agency for Research on Cancer (IARC), there is some dispute regarding the use of cotinine concentration markers which are subject to error based on varied cotinine cut-off points for discerning tobacco users from non-users (IARC, 2009). Nonetheless, in the absence of more accurate biomarkers, the IARC maintain that the validity of self-report can also be threatened by the ways in which survey questions are worded. In the TILDA study, the questions on tobacco use were comparable with questions used in other major studies on ageing such as the Survey of Health, Ageing and Retirement in Europe (SHARE), the English Longitudinal Study on Ageing (ELSA) and the Health and Retirement Survey (HRS) which was carried out in the United States (Kenny *et al.*, 2010).

Another problem associated with the use of self-reported measures is that it may lead to underreporting and/or overreporting of the behaviours in question. In a study to assess the accuracy of self-reported drinking, it was demonstrated that when engaging in moderate drinking, participants tended to accurately estimate their consumption. Conversely when engaging in harmful drinking, participants were more likely to underestimate their own consumption (Northcote & Livingston, 2011). Another study suggests that this misrepresentation occurs as a result of a social desirability bias (Davis, Thake & Vilhena, 2010). Social desirability bias is based on an assumption that some participants may be unwilling to divulge the extent of a harmful behaviour or they may not answer the questions honestly because of their desire to present themselves in a favourable light. This problem can be avoided by allowing participants to complete the measures anonymously (Davis *et al.*, 2010). Furthermore, where participants are being asked to retrospectively recall behaviours from six months earlier, they are more likely to either misremember, or to not remember at all, the extent to which they engaged in the said behaviour. However, self-report measures are an important tool in behavioural research and some of the problems listed above can be countered through the careful design and application of self-report measures. The survey instrument used by TILDA was developed based on best international

practice and was harmonized with other large cohort studies of ageing. In addition, the instrument was extensively tested and refined in two pilot studies.

7.2.7. Future research

The SRM which was used as a framework for this study was suitable for examining the relationship between ageing self-perceptions and drinking and smoking patterns in community dwelling older adults.

Besides the limitations outlined above, future research concerning the contribution of ageing self-perceptions to health behaviours should extend their focus to include other health behaviours such as physical activity, diet and the use of preventive health care. By continuing to use the SRM framework, the APQ could be used to test the relative contribution of ageing self-perceptions to such preventive health behaviours and elucidate the adaptive or maladaptive value that specific ageing self-perceptions may have on these behaviours, both at an individual and environmental level.

In addition to examining the role that ageing self-perceptions may play on individual health behaviours, future research should also assess their role in relation to the clustering of health risk behaviours. Given the abundant evidence linking health risk behaviour patterns to CVD, diabetes, and cancers, it is important to assess the psychological antecedents of these behaviours. In the present study, there was a strong association between the health risk behaviours and control positive and consequences positive and this association was stronger than the influence of established covariates on the health risk behaviours separately.

Research has shown that most people tend to engage in several risky health behaviours at any one time (Conry *et al.*, 2011, French *et al.*, 2008). While demographic characteristic differences have been shown to be associated with the clustering of health behaviours (French *et al.*, 2008, Moore *et al.*, 2009), there is a dearth of research examining them in relation to ageing self-perceptions. However, two studies have demonstrated how ageing self-perceptions predicted practice of more preventive health behaviours that included a healthier diet, taking more exercise, limiting alcohol consumption and avoiding or eliminating smoking (Huy *et al.*,

2010, Levy *et al.*, 2004). Nevertheless, these studies used unidimensional instruments of ageing self-perceptions to examine their role in relation to health behaviours. The SRM framework would offer a multidimensional assessment of the problem and once again elucidate the adaptive or maladaptive value that specific ageing self-perceptions may play in shaping clusters of health risk behaviour.

Finally, the two domains that emerged as particularly important in assessing the interaction between smoking and alcohol consumption were consequences and emotional representation. We know little about the level of complexity associated with these two beliefs and the APQ as a measure may not be sensitive enough to these. Guided by the research paradigm, future research might consider further development of the APQ using the SRM framework to increase the sensitivity of this measure.

7.2.8. Study conclusions

The Central Statistics Office has presented evidence to show that in Ireland, in 2011, the leading causes of death among older Irish adults were diseases of the circulatory system with ischaemic heart disease and CVD accounting for the largest proportions of these deaths. Considering past and future trends of declining health in the ageing population associated with harmful drinking and smoking, it is imperative to understand factors important to older adults' engagement in preventive health behaviours that include not smoking or abusing alcohol.

The present study assessed smoking and alcohol consumption in a way not previously examined using the Barker *et al* SRM as the study framework. Initially the study measured older adults' beliefs about their own age and ageing using the APQ which was developed based on the SRM of ageing. Then it considered the extent to which these beliefs were associated with two health behaviours.

Overall, TILDA's participants expressed positive views regarding the ageing process in that they acknowledged more positive than negative aspects to ageing. However, the oldest age group perceived their ability to cope with ageing more negatively. While the mean scores differed significantly between the youngest age groups (50-74 years)

and the oldest age groups (75+ years) across all seven of the APQ domains, it should be noted that in all domains the difference was less than one standard deviation of change. Nonetheless, the variability of ageing beliefs at an individual level indicated that many older Irish adults did not incorporate negative ageing stereotypes into their own self-perceptions.

The study also revealed that while some of the individual domains of the APQ were implicated as risk factors for engaging in harmful health behaviours others were found to be protective against harmful engagement. There was evidence that an individual's positive or negative beliefs about ageing was associated with their health behaviours and that this relationship was stronger when there was an interrelationship between the health behaviours on two of the APQ domains.

In this study, ageing self-perceptions that involved being constantly aware of getting old and not being able to distance oneself from ageist stereotypes was associated with how older adults regulate their health behaviours. While a negative conception of one's ageing self was associated with an increased likelihood of engaging in harmful drinking, not being constantly aware of one's own ageing was associated with smoking cessation, as was having a positive outlook regarding the ageing process. In addition, individuals who perceived that they were in control over negative ageing experiences showed a degree of psychological resilience over and above those who perceived little control over their negative ageing experiences by regulating their drinking behaviour to prevent undesired intra-personal outcomes. Moreover, individuals who perceived strong beliefs regarding the negative consequences of ageing were more likely to be never smokers. Additionally, when there was an interrelationship between the health behaviours, perceptions on both of the consequences domains and the emotional representation domains were more negative. This indicated that individuals who saw fewer positive consequences to ageing reduced their level of engagement in the combined health behaviours. On the other hand, when they perceived a more intense negative emotional response to ageing, they engaged in higher levels of risky health behaviours.

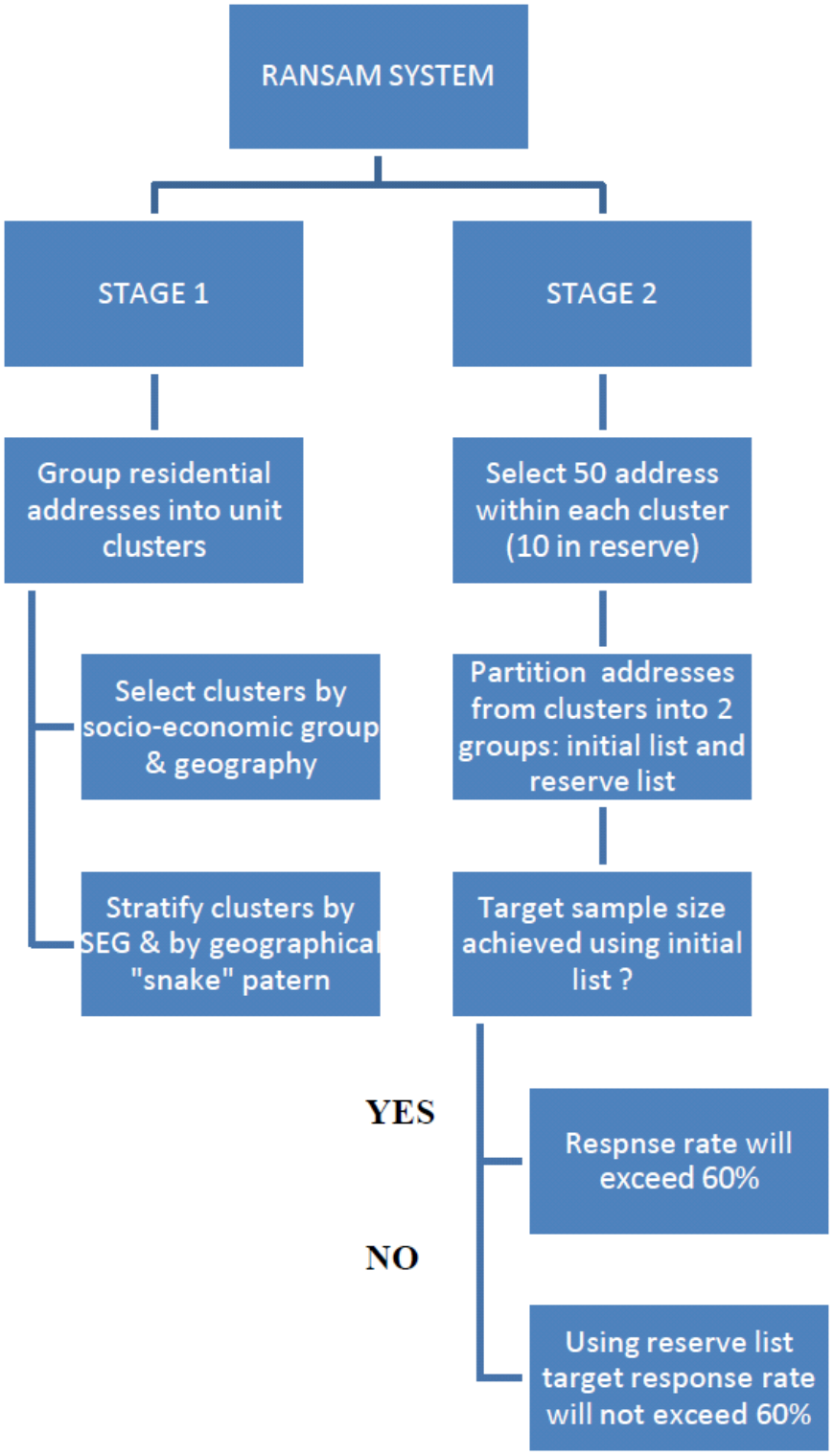
Although the explanatory power of some of the established covariates of alcohol and tobacco consumption was stronger than that of the individual APQ domains, this study demonstrated the benefits to applying the psychology of ageing to health behaviours. In so doing we may gain a better understanding of the ways in which our cognitive representations of ageing are associated with how we might regulate our health behaviours to manage our ageing and how we in turn appraise our ability to cope with our actions.

These findings have some implications at a practical level as the individual domains of the ageing experience can be targeted in interventions aimed at facilitating more desirable or adaptive outcomes or to moderate maladaptive outcomes associated with old age. Such interventions could be implemented at an individual level, at a societal level by means of public education, or at a clinical level by means of psychological intervention. The findings also have implications at theoretical level as further development of the APQ using the SRM framework might further elucidate the adaptive or maladaptive value that specific ageing self-perceptions may play in shaping clusters of health risk behaviour.

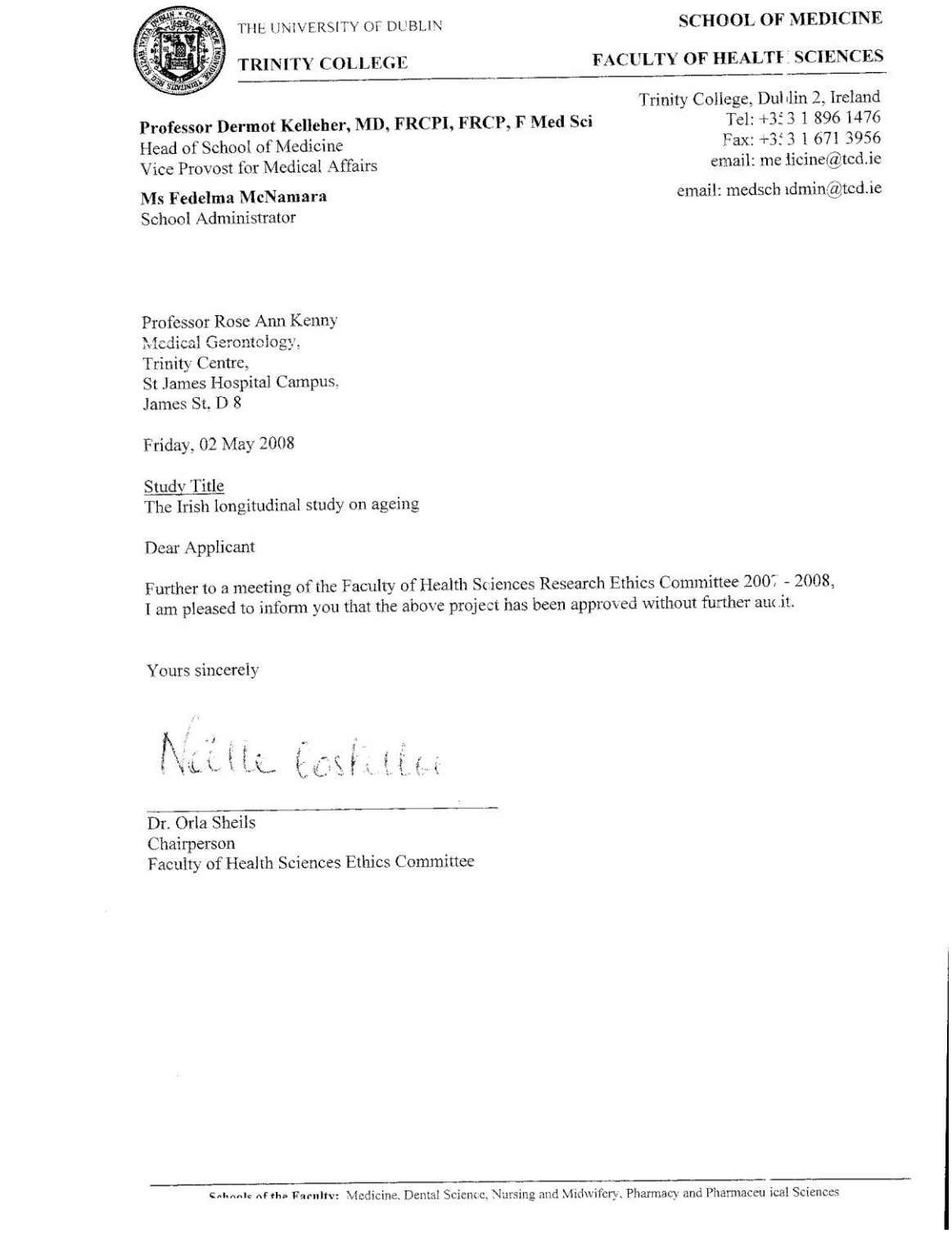
In light of population ageing, there is an increasing need to give ageing self-perceptions more detailed consideration in ageing research to help us understand their potential influences on why some older adults engage in preventive health behaviours while others do not. It is hoped that the information generated from this thesis will promote a critical evidence-base that will shape healthcare delivery and social policy and to foster disease prevention with health promotion efforts and systemic reforms.

Appendices

Appendix A. **Stages involved in TILDA's sample design**



Appendix B. Confirmation of ethical approval for TILDA



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Friday, 02 May 2008

Study Title
The Irish longitudinal study on ageing

Dear Applicant

Further to a meeting of the Faculty of Health Sciences Research Ethics Committee 2007 - 2008, I am pleased to inform you that the above project has been approved without further audit.

Yours sincerely

Dr. Orla Sheils
Chairperson
Faculty of Health Sciences Ethics Committee

Figure A 1: Confirmation of ethical approval for TILDA

Appendix C. Additional results tables

Table A 1: Missing data for the dependent and outcome variables (n = 6576)

Item and subscale	Number missing (%)
Timeline acute/chronic	***1,769 (22)***
1	1,463 (18)
2	1,464 (18)
3	1,504 (18)
4	1,491 (18)
5	1,508 (18)
Timeline cyclical	***1,678 (21)***
27	1,550 (19)
28	1,536 (19)
30	1,506 (18)
31	1,507 (18)
32	1,474 (18)
Consequences positive	***1,611 (20)***
6	1,453 (18)
7	1,505 (18)
8	1,452 (18)
Consequences negative	***1,743 (21)***
16	1,466 (18)
17	1,511 (18)
18	1,528 (19)
19	1,501 (18)
20	1,515 (19)
Control positive	***1,635 (20)***
10	1,459 (18)
11	1,474 (18)
12	1,475 (18)
14	1,443 (18)
15	1,436 (18)
Control negative	***1,425 (17)***
21	1,507 (18)
22	1,518 (19)
23	1,537 (19)
24	1,540 (19)
Emotional representation	***1,752 (21)***
9	1,468 (18)
13	1,480 (18)
25	1,514 (19)
26	1,509 (18)
29	1,535 (19)

Table A1.../continued

Age	0 (0)
Education	2 (0.03)
Socioeconomic group	1 (0.01)
Marital status	0 (0)
Physical activity	66 (1.0)
Smoker Current/Past/Never	0 (0)
Current drinker	1 (0.01)
Standard units per day	4 (0.06)
Frequency of units taken	3 (0.04)

Table A 2: APQ domains mean scores with 95% confidence interval (n = 6576)

APQ Domain	Mean	95% CI
Timeline acute/chronic	2.63	2.60 - 2.65
Timeline cyclical	2.68	2.66 - 2.70
Consequences positive	3.79	3.78 - 3.81
Consequences negative	2.85	2.83 - 2.87
Control positive	3.96	3.95 - 3.97
Control negative	2.83	2.81 - 2.85
Emotional representation	2.28	2.27 - 2.31

Table A 3: Univariate analysis of the relationship between the APQ domains and drinking status (n = 6576)

APQ domains	Non-drinker	Moderate drinker	Harmful drinker	P value[a]
Timeline acute/chronic	2.69 (0.93)	2.58 (0.85)	2.64 (0.84)	<.001
Timeline cyclical	2.69 (0.88)	2.68 (0.83)	2.68 (0.83)	= 0.8720
Consequences positive	3.78 (0.75)	3.81 (0.68)	3.78 (0.69)	= 0.0983
Consequences negative	2.99 (0.91)	2.80 (0.84)	2.81 (0.82)	<.001
Control positive	3.88 (0.63)	4.00 (0.57)	3.97 (0.58)	<.001
Control negative	3.01 (0.87)	2.77 (0.80)	2.78 (0.81)	<.001
Emotional representation	2.28 (0.81)	2.28 (0.77)	2.31 (0.79)	= 0.3658

Note: Means (standard deviations) are shown

[a] Derived from one-way ANOVA

Table A 4: Marginal effects after MNLM for probability of change in drinking status on the APQ domains (n = 6576)

	Moderate Drinker	Harmful Drinker
Timeline acute/chronic	0.002 (0.008)	0.014 (0.009)
Consequences Negative	-0.004 (0.011)	0.012 (0.010)
Control Positive	0.009 (0.0121)	0.013 (0.011)
Control Negative	-0.016 (0.0105)	-0.007 (0.009)

Standard error statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table A 5: Smoking history by age and sex (n = 6576)

	Never		Former		Current		Total
	%	95% CI	%	95% CI	%	95% CI	
Male							
50-64	39	(38-41)	41	(37-43)	20	(17-23)	1693
65-74	33	(28-34)	54	(51-58)	14	(11-18)	871
>=75	31	(27-36)	56	(52-59)	13	(11-16)	442
Total	36	(34-37)	47	(43-51)	17	(15-20)	3006
Female							
50-64	49	(46-50)	32	(30-35)	20	(17-23)	2159
65-74	55	(50-56)	31	(29-33)	15	(15-18)	882
>=75	57	(53-61)	34	(30-37)	9	(6-11)	529
Total	51	(48-52)	32	(30-35)	17	(14-20)	3570

Note. CI = confidence interval

Table A 6: Univariate analysis of the relationship between the APQ domains and smoking status (n = 6576)

APQ domains	Non-drinker	Moderate drinker	Harmful drinker	P value[a]
Timeline acute/chronic	2.58 (0.87)	2.65 (0.85)	2.71 (0.87)	<.001
Timeline cyclical	2.63 (0.83)	2.70 (0.83)	2.77 (0.87)	<.001
Consequences positive	3.83 (0.69)	3.76 (0.70)	3.78 (0.72)	= 0.0026
Consequences negative	2.82 (0.86)	2.87 (0.84)	2.88 (0.86)	=0.0248
Control positive	3.98 (0.58)	3.95 (0.57)	3.93 (0.63)	=0.0074
Control negative	2.80 (0.83)	2.82 (0.82)	2.93 (0.82)	<.001
Emotional representation	2.24 (0.76)	2.32 (0.77)	2.41 (0.84)	<.001

Note: Means (standard deviations) are shown

[a] Derived from one-way ANOVA

Table A 7: Marginal effects after MNLM for the probability of change in smoking status on the APQ domains (n = 6576)

	Former Smoker	Current Smoker
Timeline acute/chronic	-0.019 (0.011)	0.011 (0.007)
Timeline cyclical	0.015 (0.012)	0.002 (0.008)
Consequences positive	-0.022 (0.011)*	0.008 (0.008)
Consequences negative	-0.013 (0.012)	-0.025 (0.001)*
Control positive	0.004 (0.014)	-0.010 (0.009)
Control negative	-.0.030 (0.011)*	0.021 (0.007)*
Emotional representation	0.027 (0.014)	0.008 (0.009)

Standard error statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table A 8: mvreg following MANCOVA for the association of ageing self-perceptions & other covariates with alcohol & smoking behaviour (n=6576)

	Variable	Model I	Model II
Drinking Status	Timeline acute	0.006	-0.003
		(0.47)	(0.25)
	Timeline cyclical	0.009	0.012
		(0.57)	(0.90)
	Consequences positive	-0.038	-0.047
		(2.70)**	(3.41)**
	Consequences negative	-0.054	-0.011
		(3.53)**	(0.71)
	Control positive	0.071	0.055
		(4.18)**	(3.32)**
	Control negative	-0.088	-0.038
		(6.44)**	(2.78)**
	Emotional representation	0.070	0.042
		(4.08)**	(2.47)*
	Age		-0.020
			(17.38)**
	Gender		-0.280
			(14.97)**
	Marital Status		0.005
			(0.54)
	SES status		-0.028
			(4.87)**
	Education		0.038
			(2.49)*
	Self-rated health		-0.024
			(2.70)**
	Mental health status		0.005
			(0.32)
	Physical Activity		-0.012
			(1.07)
Smoking	Timeline acute	0.025	0.004
		(1.86)	(0.28)
	Timeline cyclical	0.016	0.029
		(1.07)	(1.92)
	Consequences positive	-0.015	-0.014
		(1.03)	(0.99)
	Consequences negative	-0.047	-0.060
		(3.09)**	(3.87)**
	Control positive	-0.033	-0.010
		(1.96)	(0.58)
	Control negative	0.029	0.009
		(2.11)*	(0.66)
	Emotional representation	0.057	0.037
		(3.34)**	(2.16)*

Age	-0.010
	(8.38)**
Gender	-0.192
	(10.12)**
Marital Status	0.051
	(5.80)**
SES status	-0.008
	(1.44)
Education	-0.127
	(8.22)**
Self-rated health	0.069
	(7.49)**
Mental health status	0.064
	(4.14)**
Physical Activity	-0.011

* p<0.05, ** p<0.01, *** p<0.001
Note: mvreg = multivariate regression

Appendix D. **TILDA questions about alcohol consumption**

18. DO YOU DRINK ALCOHOL?

PLEASE TICK ONE BOX

YES ☐

NO ☐ GO TO 26

19. DURING THE LAST SIX MONTHS, HOW OFTEN HAVE YOU DRUNK ANY ALCOHOLIC BEVERAGES, LIKE BEER, CIDER, WINE, SPIRITS OR COCKTAILS?

	PLEASE TICK ONE BOX
1. Almost every day.	☐
2. Five or six days a week.	☐
3. Three or four days a week.	☐
4. Once or twice a week.	☐
5. Once or twice a month.	☐
6. Less than once a month.	☐
7. Not at all in the last 6 months.	☐

20. DURING THE LAST SIX MONTHS, HOW OFTEN HAVE YOU HAD MORE THAN TWO DRINKS IN A SINGLE DAY? (A DRINK IS A HALF PINT OF BEER OR A GLASS OF WINE)

	PLEASE TICK ONE BOX
1. Almost every day.	☐
2. Five or six days a week.	☐
3. Three or four days a week.	☐
4. Once or twice a week.	☐
5. Once or twice a month.	☐
6. Less than once a month.	☐
7. Not at all in the last 6 months.	☐

21. DURING THE LAST SIX MONTHS, ON THE DAYS YOU DRINK, ABOUT HOW MANY DRINKS DO YOU HAVE?

☐

22. HAVE YOU EVER FELT THAT YOU SHOULD CUT DOWN ON DRINKING?

PLEASE TICK ONE BOX

YES ☐

NO ☐

23. HAVE PEOPLE EVER ANNOYED YOU BY CRITICISING YOUR DRINKING?

PLEASE TICK ONE BOX

YES ☐

NO ☐

24. HAVE YOU EVER FELT BAD OR GUILTY ABOUT DRINKING?

PLEASE TICK ONE BOX

YES ☐

NO ☐

25. HAVE YOU EVER TAKEN A DRINK FIRST THING IN THE MORNING TO STEADY YOUR NERVES OR GET RID OF A HANGOVER?

PLEASE TICK ONE BOX

YES ☐

NO ☐

Figure A 2: Questions about alcohol consumption as they appear on the SCQ (Barrett et al, 2011)

Appendix E. **TILDA questions about smoking behaviour**

SECTION 13. BEHAVIOURAL HEALTH (BH)

INTRO: Now I would like to ask some questions about your lifestyle.

Smoking

BH001: Have you ever smoked cigarettes, cigars, cigarillos or a pipe daily for a peric
at least one year?
1. Yes **GO TO BH002**
5. No **GO TO BH101**
98. DK **GO TO BH101**
99. RF **GO TO BH101**
(SHARE/ Similar question ELSA/HRS)

BH002: Do you smoke at the present time?
IWER: IF RESPONDENT SMOKED IN THE PAST 3 MONTHS CODE 1
1. Yes **GO TO BH004**
5. No, I have stopped **GO TO BH003**
98. DK **GO TO BH003**
99. RF **GO TO BH003**
(SHARE/ Similar question ELSA/HRS)

BH003: How old were you when you stopped smoking?
1 … 100
98. DK
99. RF
(SHARE/ Similar question HRS)

BH004: For how many years [do/did] you smoke altogether?
1 … 100
98. DK
99. RF
(SHARE/ Similar question HRS)

BH005: What do/did you smoke (before you stopped)?
IWER: CODE ALL THAT APPLY

1. Cigarettes	**GO TO BH006**	**[bh005_1]**
2. Pipe	**GO TO BH007**	**[bh005_2]**
3. Cigars or cigarillos	**GO TO BH008**	**[bh005_3]**
98. DK	**GO TO BH101**	**[bh005_4]**
99. RF	**GO TO BH101**	**[bh005_5]**

(SHARE/ Similar question ELSA)

BH006: How many cigarettes do/did you smoke on average per day?
1 … 100
98. DK
99. RF
(SHARE/ Similar question ELSA)
BL: GO TO BH101

BH007: How many pipes do/did you smoke on average per day?
1 … 100
98. DK
99. RF
(SHARE/ Similar question ELSA)
BL: GO TO BH101

BH008: How many cigars or cigarillos do/did you smoke on average per day?
1 … 100
98. DK
99. RF
(SHARE/ Similar question ELSA)
BL: GO TO BH101

Appendix F. TILDA questions about physical activity

Exercise section

INTRO: We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The next set of questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and garden work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

BH101: During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?
1. _____Number of days per week
5. No I have not done any vigorous physical activities **GO TO BH103**
98. DK/ NOT SURE
99. RF

BH102: How much time did you usually spend doing **vigorous** physical activities on one of those days?
_____ hours per day (0 …10)
_____ minutes per day **[bh102a]**
98. DK/NOT SURE
99. RF

BH103: Think about all the **moderate** activities that you did in the **last 7 days**. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

1. _____ days per week
5. No I have not done any moderate physical activities **GO TO BH105**
98. DK
99. RF

BH104: How much time did you usually spend doing **moderate** physical activities on one of those days?
_____ hours per day (0 …10)
_____ minutes per day **[bh104a]**
98. DK/NOT SURE
99. RF

BH105: Now think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.
During the last 7 days, on how many days did you walk for at least 10 minutes at a time?
1. _____ days per week
5. No I have not done any walking **GO TO BH107**
98. DK
99. RF

BH106: How much time did you usually spend **walking** on one of those days?
_____ hours per day (0 …5)
_____ minutes per day **[bh106a]**
98. DK/NOT SURE
99. RF

BH107: The last question is about the time you spent **sitting** on weekdays during the **last 7 days.** Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television. During the **last 7 days**, how much time (per day) did you spend **sitting** on a week day?
(This question is looking for the usual number of hours spent sitting on a typical week day. If respondent has difficulty calculating, interviewer may suggest they approximate by subtracting time spent sleeping, walking, standing, exercising etc. from the 24 hours)

_____ hours per day (0 …20)
_____ minutes per day **[bh107a]**
98. DK/NOT SURE
99. RF

Appendix G. **Ageing Perceptions Questionnaire**

27. WE ARE INTERESTED IN YOUR OWN PERSONAL VIEWS AND EXPERIENCES ABOUT GETTING OLDER. PLEASE INDICATE YOUR VIEWS ON THE FOLLOWING STATEMENTS (STRONGLY DISAGREE, DISAGREE, NEITHER AGREE NOR DISAGREE, AGREE, OR STRONGLY AGREE).

PLEASE TICK ONE BOX PER LINE WHICH BEST SHOWS HOW YOU FEEL ABOUT EACH STATEMENT	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
I am conscious of getting older all of the time.	☐	☐	☐	☐	☐
I am always aware of my age.	☐	☐	☐	☐	☐
I always classify myself as old.	☐	☐	☐	☐	☐
I am always aware of the fact that I am getting older.	☐	☐	☐	☐	☐
I feel my age in everything that I do.	☐	☐	☐	☐	☐
As I get older I get wiser.	☐	☐	☐	☐	☐
As I get older I continue to grow as a person.	☐	☐	☐	☐	☐
As I get older I appreciate things more.	☐	☐	☐	☐	☐
I get depressed when I think about how ageing might affect the things that I can do.	☐	☐	☐	☐	☐
The quality of my social life in later years depends on me.	☐	☐	☐	☐	☐
The quality of my relationships with others in later life depends on me.	☐	☐	☐	☐	☐
Whether I continue living life to the full depends on me.	☐	☐	☐	☐	☐
I get depressed when I think about the effect that getting older might have on my social life.	☐	☐	☐	☐	☐
As I get older there is much I can do to maintain my independence.	☐	☐	☐	☐	☐
Whether getting older has positive sides to it depends on me.	☐	☐	☐	☐	☐

PLEASE TICK ONE BOX PER LINE THAT BEST DESCRIBES YOUR VIEW FOR EACH STATEMENT.	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
Getting older restricts the things that I can do.	☐	☐	☐	☐	☐
Getting older makes me less independent.	☐	☐	☐	☐	☐
Getting older makes everything a lot harder for me.	☐	☐	☐	☐	☐
As I get older I can take part in fewer activities.	☐	☐	☐	☐	☐
As I get older I do not cope as well with problems that arise.	☐	☐	☐	☐	☐
Slowing down with age is not something I can control.	☐	☐	☐	☐	☐
How mobile I am in later life is not up to me.	☐	☐	☐	☐	☐
I have no control over whether I lose vitality or zest for life as I age.	☐	☐	☐	☐	☐
I have no control over the effects which getting older has on my social life.	☐	☐	☐	☐	☐
I get depressed when I think about getting older.	☐	☐	☐	☐	☐
I worry about the effects that getting older may have on my relationships with others.	☐	☐	☐	☐	☐
I go through cycles in which my experience of ageing gets better and worse.	☐	☐	☐	☐	☐
My awareness of getting older comes and goes in cycles.	☐	☐	☐	☐	☐
I feel angry when I think about getting older.	☐	☐	☐	☐	☐
I go through phases of feeling old.	☐	☐	☐	☐	☐
My awareness of getting older changes a great deal from day to day.	☐	☐	☐	☐	☐
I go through phases of viewing myself as being old.	☐	☐	☐	☐	☐

Figure A 3: Ageing Perceptions Questionnaire as it appears on the SCQ (Barrett et al, 2011)

The Ageing Perceptions Questionnaire (APQ)

Scoring Key

a) Views about getting older

For these seven subscales, items are rated on a 5-point scale ranging from 'strongly disagree' (1), 'disagree' (2), 'neither agree nor disagree' (3) , 'agree' (4) and 'strongly agree' (5). With the exception of control negative, subscales items are scored from 1 to 5. The mean score for each subscale is calculated. Higher scores are indicative of greater endorsement of a specific perception.

Timeline acute/chronic:	Mean of items 1, 2, 3, 4, 5
Timeline cyclical:	Mean of items 27, 28, 30, 31, 32
Emotional Representations:	Mean of items 9, 13, 25, 26, 29
Control positive:	Mean of items 10, 11, 12, 14, 15
Control negative:	Mean of items 21, 22, 23, 24 (items are reverse-scored)
Consequences positive:	Mean of items 6, 7, 8
Consequences negative:	Mean of items 16, 17, 18, 19, 20

Figure A 4: Scoring Key for the APQ (Kenny *et al.*, 2010)

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